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FOOD MANUFACTURE

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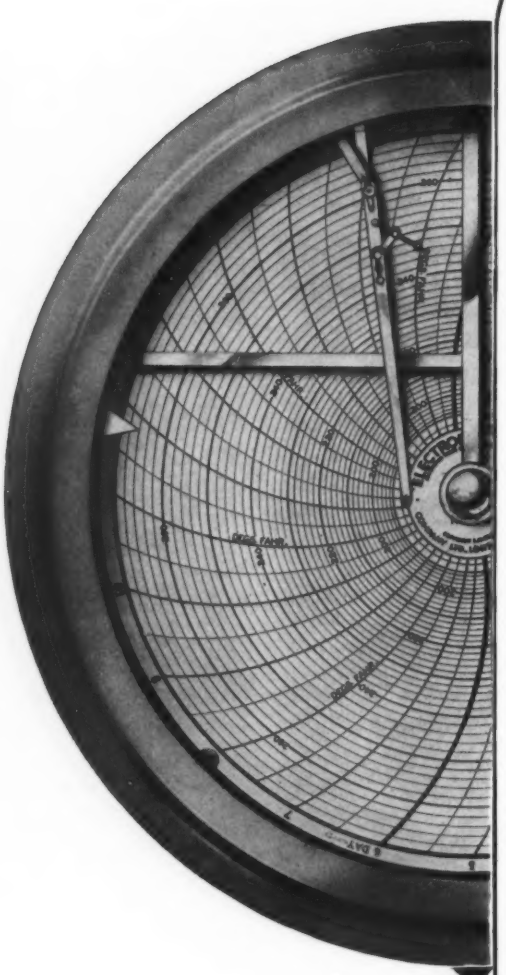

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FOOD MANUFACTURE

Vol. XIII, No. 2 February, 1938

Reductio ad Absurdum

IN THE annual report of the Analyst for the city of Birmingham for 1936, it is mentioned that a sample was described on the label as " Milk Jelly ", while another part of the label bore the words, " Contains No Milk ". There was therefore a contradiction, but in view of the fact that the disclaimer as to milk was legibly printed on the packet, no administrative action was taken. Here we have a definitely misnamed product, the misnaming of which is neutralised by a repudiation on the same label. Truly a weird and wonderful example of the workings of the Food and Drugs Act.

The U.S. Bureau of Animal Industry is reported to have suddenly discovered that meat and meat products in which nitrites as such have been used cannot be exported to England and Wales after January 1, 1938. We have made enquiries as to any changes (it is evident that nitrited meats have been coming over), but, like the number of legs a caterpillar has got, " nobody knows "!

London's Water

The recent epidemic at Croydon has focussed the average Londoner's attention on to water supplies, and this makes Colonel Harold's annual report on water examination to the Metropolitan Water Board even more interesting than might have been the case normally. In addition to the river water from the Thames, the Lea and the New River, London derives water from 55 chalk wells, some of which extend into the green sand. In the early days of the Metropolitan Water Board's activities water from the chalk enjoyed a deservedly high reputation for purity. Chalk is a good filtering medium, and its basic character favours the oxidation of organic nitrogenous matter to nitrate providing there is enough dissolved oxygen present. For 31 years continuous records have been kept of the bacterial and chemical characters of London waters under every meteorological condition. These have led to the crystallisation of ideas regarding the controversial *coli-aerogenes* pollution. The first evidence of deterioration of the quality of water in a well may be the appearance of atypical coliform organisms, which may increase to a concentration of one or more per million before the typical colony appears. In other words, the danger sign of pollution is the atypical coliform organism. The worst combination of circumstances is for drought, which has served to emphasise the existence of channels, to be succeeded by periods of heavy rainfall such as occurred in 1935-36.

The Grub in the Chocolate

Food manufacturers and dealers in foodstuffs will have followed the case of Natchoff *v.* Cadbury, heard at Whitechapel on December 22 with considerable interest. The plaintiff claimed £25 damages in respect of illness which she alleged to be due to the consumption of chocolate of Messrs. Cadbury's manufacture. The chocolate contained a maggot. The action was founded on negligence, which Messrs. Cadbury denied. The case brought forth one or two interesting points. In the first place, the plaintiff alleged that she had been informed that the chocolate had been supplied to the retailer only two days before she bought it. The defendants, however, proved that the chocolate which was purchased on September 13, 1937, was manufactured in May and delivered to the retailer on June 15, 1937. Three months is rather a different proposition to two days! It was on this period of time during which the chocolate was in the retailer's shop that the defence rested. The life cycle of the Ephestia moth was quoted and the Judge accepted the suggestion that, in view of the normal life cycle of the insect the grub found in the chocolate must have hatched from an egg laid after the goods had left the manufacturer's control.

No Negligence

The remarks of the Judge are of great importance, and should give a certain amount of satisfaction to manufacturers, who are always liable to be held to ransom by consumers, sometimes on very

trivial grounds. People hold up their hands in pious horror if they find a grub of the chocolate moth in a packet of chocolate or a flour moth larva in a bag of flour, but whoever heard of anyone prosecuting a greengrocer because they found a caterpillar in a cauliflower? Many manufacturers are compelled to have a special department for handling complaints, and are forced in many instances to pay compensation or to replace goods for something which has nothing to do with the manufacturer and frequently is due to a retailer who will not take the trouble to rotate his stocks properly or who stores foodstuffs in unsuitable places. Flour stored in proximity to moth balls soon acquires a most objectionable odour—and the manufacturer gets the blame! The Judge said, "I do not think that the legal advisers of plaintiffs who desire to bring actions against manufacturers are always sufficiently awake to the difficulties of succeeding in such actions". He also pointed out that, "the researches of modern science are equally open to the retailer as they are to the manufacturer". The trouble is that the retailer seldom takes the trouble to learn anything about what he sells, being mainly concerned with the amount of discount he can screw out of the manufacturer. So far the retailer has felt that he can always throw any complaint back on to the manufacturer and the sooner he realises that he has certain obligations himself the better. This case should do something to drive home that lesson. It would also be a good thing if manufacturers would be courageous enough to take certain impossible complaints to the courts instead of being blackmailed into giving compensation where none is called for.

Changes in the Demand for Food

The declining importance of heavy manual labour in modern industry has caused a falling off in the demand for the energy-producing starchy foods and demand for fruit, vegetables, and dairy products, according to the World Economic Survey (League of Nations). This tendency has been supplemented by improved knowledge of dietetics, particularly with regard to the value of protective foods. It is estimated that the world consumption of wheat per head fell by about 4 per cent. between the immediate post-war years and period 1925-30.

The decline in U.S.A. is very definite, wheat flour consumption fell steadily from 223·9 lb. per head in 1889 to 175·2 lb. in 1929.

In the United Kingdom the increase in the consumption of protective foods is marked. Between 1913 and 1928 the consumption of butter per head rose from 9·9 lb. to 14·6 lb.; cheese from 5·5 lb. to 33·1 lb.; bacon and ham from 13·7 lb. to 23·1 lb. Such evidence as exists shows a similar tendency in other countries.

The proportions of income spent on food varies at the different levels of income. As income rises the percentage spent on foods tends to fall. During the depression the reduction in incomes forced large numbers of people in all countries to find their nourishment in cheaper diets. At the same time the heavy falls in world prices placed many foodstuffs within the purchasing power of people at the lower income levels, especially in countries where trade was relatively free.

The total consumption of food per head has varied little. Calculated in terms of calories and by weight, the total is little higher in U.K. and U.S.A. than before the war. When physiological needs for food have been fully satisfied, not more food but a greater variety and finer qualities are required. People change their diets slowly. Trends in consumption that are now apparent actually began before the war. The tendency now is for demand to concentrate on foods for which the demand is elastic. The term "elastic demand" is used to describe a demand which falls as the price of a commodity rises and rises as the price of a commodity falls. The education of the housewife in the matter of the protective value of fruit, vegetables, milk, butter will invoke a readier response in her than any lowering of prices or increase of purchasing power.

Protective Foods

An excellent example of this is furnished by the citrus fruit industry, which has increased its output considerably. For 1925-27 the average production for grapefruit was 15·4 million boxes. This increased to 25 million in 1934-35, and at the present rate of increase may reach 50 million in 1945-46. The imports of oranges into this country have increased by 46 per cent. over the 1924-28 average.

The consumption of milk in this country between 1929 and 1934 fell by 12 per cent. This is no doubt accounted for by the decline in the consumption of porridge and milk puddings and the substitution of fruit and manufactured milk products. The falling birth-rate is a further important factor in this decline.

The figures for the consumption of eggs in this country rose from an average of 142 per head per annum in 1924-28 to 179 in 1931, then declined during the depression to 165 in 1933 to recover to

172 in 1934. The consumption of meat has shown the same trend, from 139 lb. per head in 1929 to 145 in 1932, and a slight fall to 143 in 1934.

The Food and Drugs Bill

The Local Government and Public Health Consolidation Committee has just published its Third Interim Report and a draft of a Food and Drugs Bill. The Committee was originally appointed in 1930 when Mr. Greenwood was Minister of Health. Since its creation the composition of the Committee has varied owing to deaths and other causes, and changes both in the important positions of chairman and secretary have occurred. The Committee had a very wide field to explore, and many very ancient Acts to revise and a perusal of this report shows that the task has been attacked in a very thorough manner. The draft Bill is divided into several sections: the composition and description of food, provisions as to milk, dairies and artificial cream, the Bread Acts, provisions as to the importation of certain produce, markets, slaughterhouses and cold air stores.

The Bread Acts

In the case of bread the only existing statute law is in the Bread Act of 1822, the Bread Act of 1836 and the Bread Acts Amendment Act of 1922. The first of these was confined to London and the second extended the legislation to the whole country. The effect of the Bread Acts Amendment Act, 1922, was to remove the prohibition imposed by the previous Acts against the addition of ingredients used for self-raising flour. As self-raising flour had been a commercial product in this country since 1860 this Amendment was well overdue. The report suggests the repeal without re-enactment of the two earlier Acts and slightly to widen the scope of the regulation making power of the Act of 1922 so as to enable the Minister to make Bread and Flour Regulations covering the whole field. The Committee also considered the Report of 1927 on the treatment of flour with chemical substances. That Committee stated that they were "not prepared, on the present knowledge available, to recommend the complete elimination of the bleaching agents and improvers now in use". That Report ended with the suggestion that it should be compulsory for the manufacturers of chemical substances for use either as bleaching agents or improvers to declare the nature of the ingredients of which they are composed and that millers should be required to inform their customers whether their flour has been bleached or improved, and, if so, with what substances. To meet this, in Clause 28 of the proposed Bill, provisions have been made prohibiting or restricting, either absolutely or subject to conditions, the addition of any substance or the application of any treatment to flour intended for sale. Legislation in regard to bread and flour is long overdue and precise definitions are required. Is "flour" to be regarded as flour of wheat or may it contain unlimited quantities of rice, corn, or potato starch?. The purchaser of flour expects to get wheaten flour when he asks for flour, but there is no legal definition to enforce this.

Milk and Cream

This section of the Bill consists chiefly of provisions reproduced from the Milk Acts of 1915, 1922, and 1934. The Committee were faced with the fact that the scope of the Milk and Dairies Orders which can be made under the Milk Acts of 1915 and 1922 is amply wide to cover the subject matter of these provisions. On examining the Milk and Dairies Order, 1926, it became clear that provisions supplemental and closely analogous to the sections are to be found in the Order, with the result that what should be for convenience of administration a single code is at present split into two parts—one is the Statute Book, the other is the Order. The present Act is so framed as to remove these anomalies.

Middle-Aged Spread

"A bald-headed and pot-bellied, bibulous, smoke-sucking beast." Not an entirely attractive picture of the creature we shall become (according to Dr. Leonard Williams) unless we behave ourselves with more moderation at the dinner-table. Shakespeare probably has done much to save the face of the corpulent. He makes Cæsar dread the lean and hungry-looking Cassius. "Let me have men about me that are fat," he demands. But one suspects that dictators prefer "yes-men". And when a man is gently sinking into a sebaceous sea he is more likely to do as he is told than to exhibit inconvenient initiative.

Many pitfalls (and probably gins) beset the path of the fat. It is one of their foibles that they claim frugality. They forget (or do not know) that a sandwich and a glass of ale have a greater fattening effect than a plate of roast beef, horse-radish sauce, two potatoes, half a pound of brussels sprouts, and a glass of red wine. One favourite fallacy is that it is not food that fattens, because thin people (who bless the term "basal metabolism") are oft-times big eaters. But the truth is—fat comes from food.

And a fat person is eating more food than his or her body is capable of disposing of, whether it is normal or abnormal. The answer is in almost every case—eat less and move more.

What is Suet?

Apparently the answer to this question is, at the present time, rather obscure. Recently the Inspector of Weights and Measures of the Buckinghamshire County Council prosecuted a firm of manufacturers for giving a false warranty in respect of shredded beef suet. It was stated that the suet contained a considerable amount of rice flour and that the warranty was for shredded beef suet and not for shredded beef suet with rice flour. The prosecution agreed that a small amount of rice flour can be added to beef suet, as this was stated to be a common practice to prevent the shreds from sticking together. It was, however, emphasised that the amount added should not be greater than necessary to achieve this object, because rice flour is not a substitute for suet, it is merely a vehicle to enable the suet to be sold in shreds. Any excess must be regarded as adulteration. During the war it was laid down that 17·5 per cent. of rice flour is permissible. It is generally accepted that beef suet should contain at least 83 per cent. beef fat. The sample in question contained over 26 per cent. of rice flour. The prosecution succeeded and a fine was imposed. While we agree that the practice of overloading suet with rice flour is most objectionable and does constitute adulteration, we do feel that more explicit definitions should be issued by the authorities so that traders may not unwittingly commit a felony.

Typhoid

The Croydon enquiry was closed on January 12, the Chairman, Mr. Murphy, promising that a report would be issued with the least possible delay. A definite opinion is difficult to arrive at until such time as this report is available. The daily reports published in the Press have been, for the most part, characterised by the absence of unpleasant details. Not only must the British public be prevented from being shocked, but also from being scared. The avoidance of scare would seem to be a paramount consideration in the minds of some sections of officialdom. We wonder if, while the source of the infection was still in doubt, the advantages of a "Boil your Milk and Water" notice would have been counterbalanced by the effects of panic? Reading between the lines, the danger of Croydon becoming a deserted village was anticipated.

Our contemporary, *The Manufacturing Chemist* of January, energetically stresses the need for increased control. In connection with control, a wealth of comment is enclosed in a remark made by Dr. Suckling during the giving of his evidence. He was asked how often he would advise sampling a water supply. He said it depended upon many factors, but *he did not agree with the practice of going from April to September without a sample!* That sundry "stable doors" are hastily being closed is evidenced by the call for water chemists in the advertisement columns of the daily and technical press.

Apart from the matter of bacteriological impurity, the consumer suffers from the lack of standards in other respects. Why should he be supplied with water containing large amounts of gypsum and other scale-producing substances? They fur his kettles, block his hot-water pipes, waste his fuel and soap, and spoil the taste of his tea. Why should the onus of softening operations devolve upon him? We, with our contemporary, look to the official chemical bodies to press for action.

Fowl Proceedings

According to a report in the daily press, the Middlesex County Council has decided to abandon egg-laying trials. This is apparently due to a subversive movement on the part of sundry participants of the laying sisterhood. While laying an egg a White Leghorn hen developed symptoms of inebriation. The report does not state how many drinks she had had. Another hen developed an attack of nerves and broke its leg. Two North Holland Blues "died for no apparent reason; they simply lacked the will to live". It seems strange that some of the more stupid members of the animal kingdom should have registered this energetic protest against unduly competitive conditions of living. It might be rather serious if the movement spread among the nobler animals. Although they are not noted for undue intelligence, we could not visualise with equanimity a temperamental outbreak among cows, while a sudden epidemic of drunkenness or nerves in the cat tribe might well convert the world into a second Hamelin Town before the piper visited it. Man has practically dominated the animal kingdom, but if it is going to retailiate by the simple expedient of "dying on him", he will be obliged to do something about it!

WOOD CONTAINERS FOR FOODSTUFFS

By
G. W. Lacey
B.Sc., A.I.C.

The author discusses the various aspects of wood containers and the effect of certain woods upon foodstuffs. Particular reference is made to compressed plywood containers.

Filling dried milk products into wooden barrels.

THE WOODEN box or packing-case was probably the first container used commercially for the packing of goods for transportation from manufacturer to retailer, and though there have been many developments in the wrapping and packing of goods for transit since that time, the wooden box has retained its function as an outer container to afford effective protection for the carrying of goods in bulk.

So far as foodstuffs are concerned, everyone is familiar with the tea chest, the orange box, the plain deal packing-case, and the old butter tub. With the improvements in plywood manufacture a revolution in wood container design occurred, while the more recent development of pressed plywood may bring wood into service as a container for small quantities of goods.

Wood is abundant, light, strong and comparatively cheap. It can be readily built up into containers of regular shape by machinery. It is a poor conductor of heat, and so provides good protection against changes of temperature. It shrinks with loss of moisture and absorbs liquids, but is not seriously subject to distortion under the influence of dampness or external temperature changes.

Many woods possess odour which is liable to affect the flavour of certain goods. With some woods the odour may be strong, especially in a box that has been closed up for a little time. Except where the goods are already wrapped or packed it is usual therefore to separate the contents from the surface of the wood by means of linings of paper or foil or other suitable material.

Suitability for Foodstuffs

It is not possible to list every food commodity for which wood containers in one form or another are used. The variety of foodstuffs packed in bulk in wood containers includes such commodities as tea, sugar, butter and dairy products, sweetened condensed milk, dried milk powder, marshmallow, lemon cheese, mincemeat, confectionery fillings, ground almonds, ground ginger, ground rice, dried yeast, gelatine and even flour.

The amount of technical information available concerning the suitability of wood containers for foodstuffs is not extensive. Information is scattered and inconclusive, and there appears to have been no comprehensive investigation of the suitability of different kinds of timber for the construction of food containers in general.

Woods which are comparatively non-resinous, such as white pine and spruce, are in demand for food containers because they are relatively colourless. Yet, as the result of an investigation* of wood taint in butter, which was generally believed to be due to the use of the wrong kind of wood, the following conclusions were reached:

1. Every timber used, including White and Kauri pine, could impart taint.

2. Knotted and dark brown, odorous Hoop pine, although fully expected to give strong wood taint, did not do so in certain cases, and in others affected the butter to a lesser extent than was expected.

3. Quite green timber used in boxes did not cause taint when expected to do so; on the other hand, wetted lining paper did cause taint.

In fact, only in the case of butter and dairy products has the selection of suitable woods or the treating of wood containers to reduce their effect upon the flavour of food products packed in them been the subject of serious investigation. The following information communicated by the National Institute for Research in Dairying at Reading is therefore of general as well as particular interest.

Wood Containers for Butter

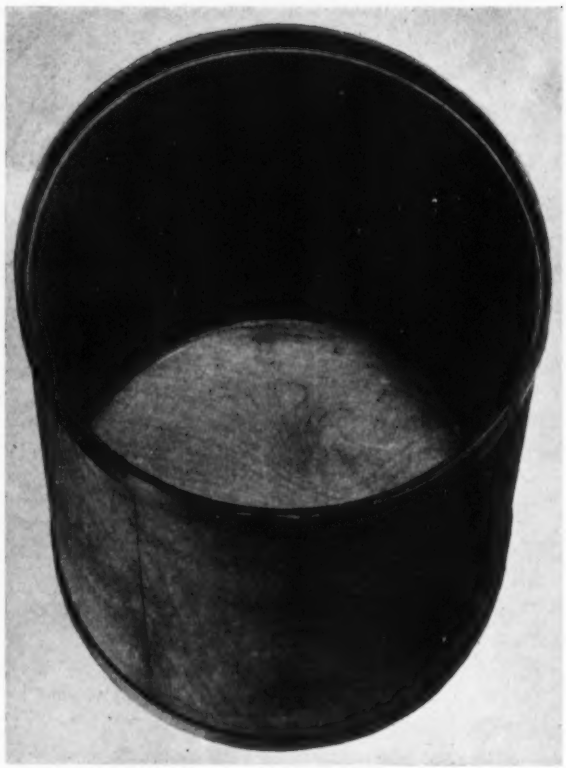
Wood has been found to be a useful packing material for dairy products, especially for butter. Most farmhouse butter in summer used to be packed in bulk in tubs or casks. No liners were used and the inner surfaces with which butter came into contact were specially treated. After tightening the hoops the container was scrubbed with cold salt water and then sterilised with hot boiling water with a towel over the open end. The wood was also "tempered" in the same process so as to allow the butter to part easily from the wood when unpacking. The timber of the container usually contained 20 to 25 per cent. of moisture after this operation, and there was little opportunity for the outer layers of butter to dry out during storage. With care during sterilisation, long storage of full-flavoured butter made in the autumn was possible in these containers.

Tubs were made from willow, ash or close-grained pine with either hazel, wire or band hoops. They were usually lidless, the surface of the butter being finished with a design which was covered with paper and/or muslin. These containers were considered more practical than earthenware crocks, the pores of which were hard to clean and which were heavy and frail.

Boxes for Export

The export trade of various butter-producing countries necessitated the use of cheap, robust butter boxes of standard dimensions, and the cost of the box and the weight of timber have been the major factors governing the selection of the timber. The Dominions have endeavoured to use local-grown timber for this purpose, coniferous wood being lightest, cheapest and easiest to work with. Highly resinous and knotty wood is not

* Report of Provisional Forestry Board, Queensland, Australia, June 30, 1930. "Investigation of Wood Taint in Butter," p. 45.

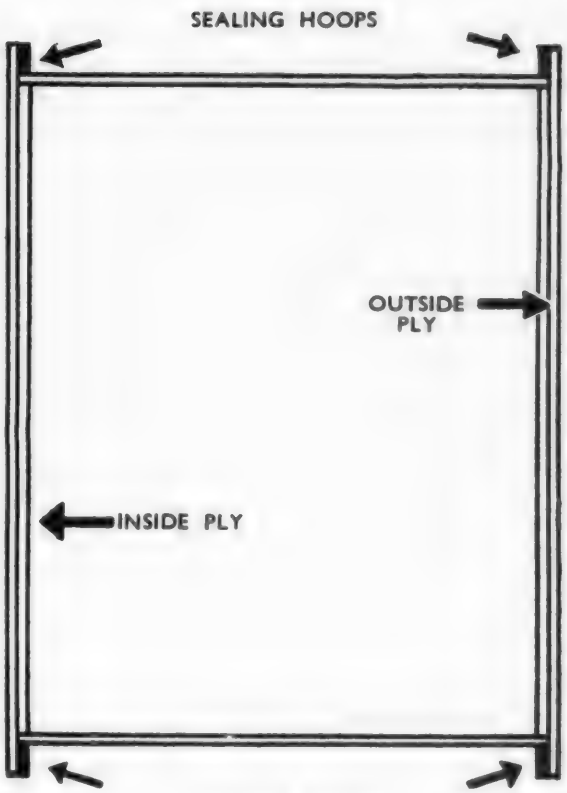


Manufactured without rivets or metal of any description inside, this keg has a perfectly clear interior. It is suitable for semi-liquids, and can be constructed to contain certain liquids.

used. The boxes are made of seasoned timber, the demand for which has been the cause of enterprise in methods of accelerated seasoning of timber. The timber must be dry, since damp or irregularly seasoned wood harbours and encourages mould growth. Some varieties of timber favour mould growth more than others. Soiling of boards in the sawmill must also be avoided.

Certain faults in long-stored butter are ascribable to the box timber. The dry timber closely adjacent to a dry parchment liner causes the outer layer of butter to lose moisture. The golden colour deepens with desiccation and this causes the butter colour to be non-homogeneous. This "primrose tint" is considered a fault in the trade, since the deeper band on the outside is unsightly and causes trouble in blending processes. The desiccation of the outer layer destroys the butter texture in that layer and also concentrates the acidity, with the result that some autoxidative change occurs to yield a slightly tallowy or "toppy" flavour, which is also considered to be a fault.

Of more frequent occurrence is the "woody" or "timber" taint confined to the outer layer of the butter by the diffusion of volatile essential oils from the timber through the liner into the butter. However, this has been overcome in the following ways: (*a*) The selection of non-aromatic timber for box making, *e.g.*, knotless New Zealand white pine; (*b*) the spraying of the inside of the box with a borax-casein mixture which is hardened with formaldehyde; and (*c*) the use of special liners, *e.g.*, metal foil-parchment layers or waxed paper-



This diagram shows the construction of the keg shown opposite.

(Both illustrations by courtesy of W. Lusty and Sons, Ltd.)

parchment liners to prevent the diffusion of the volatile essential oils into the latter.

Method (*a*) is unpractical as a full measure owing to the limitations of the timber supply. Method (*b*) has the disadvantage that a full measure of success is not obtained and that traces of formaldehyde diffuse into the outer layers of butter. Method (*c*) is only in the experimental stage and has been attended with considerable success, especially when carried out in association with methods (*a*) and (*b*).

Sweetened Condensed Milk

Sweetened condensed milk is bulk-stored in wooden barrels. The barrels are filled through a bunghole, and since it is difficult to restore them to a satisfactory, clean condition, new barrels are always preferable. Residues of milk or glucose, if old barrels are used, encourage fermentation and the formation of "buttons" in the condensed milk. The barrels are steamed thoroughly, and drained before use, and the wooden bung should be lined with a few layers of muslin before being driven in.

Dried Milk Products

Barrels are used to pack dried milk powder and dried whey, and for these products they must be airtight and moisture-proof. The inside of the barrel is usually coated with paraffin, silicate or a casein preparation to ensure these properties. The glue used in plywood manufacture is sufficient protection in plywood barrels, which have the advantage of being light and robust. Lining with a suitable paper is advisable and the product should be well packed into the container.

Design and Choice of Containers

Crates, cases, drums and barrels or kegs are the commonest types of wood containers in general service. Two main factors appear to govern the economical design and choice of container: (*a*) The container should possess sufficient strength to protect the contents and to resist loads and stresses imposed during transit consistent with economy of materials used. Surplus strength means excess of wood and therefore greater weight and higher freight charges. (*b*) The container must occupy the minimum of space; the right kind of strapping and fastening must therefore be employed suitable for the weight and bulk of contents.

The type of container chosen will also depend upon the nature of the product to be packed, its weight, and whether the contents must be kept relatively airtight and moisture-proof or proof against loss of liquid or powder. Many manufacturers now specialise in the production of wood containers for a variety of purposes so that the most suitable and economical container for a particular commodity can be readily obtained.

Soft Wood Cases

The construction of all types of soft wood containers has been very largely standardised. Construction ranges from the simplest and cheapest butt-jointed, nailed box to that of the case with tongued and grooved joints and dove-tailed or locked corners, which is very strong and most expensive. Wood end-frames, cleats or battens, inside or outside the case, are used to strengthen intermediary types, and these necessarily take up space and increase freight charges.

Plywood Developments

As already mentioned, the most interesting developments in containers for foodstuffs followed the introduction of plywood, the first large-scale use being found in the manufacture of tea chests. The great advantage of the plywood tea chest lay in its lightness compared with the old type of chest. Plywood shooks, battens and metal parts for the chest are sent out to the different growing centres, where they are assembled by native labour. These tea chests are as strong, if not stronger, than the old type of case.

The most popular plywood container for food commodities at the present time is the barrel, which is made in various patterns and sizes with riveted construction. According to requirements barrels may have two, three or four plywood body hoops, with extra metal bands for increased strength. The barrel has a butt-jointed seam, which may be made with an external metal binding strip or internal plywood strip. The top and bottom may be of plywood or of ordinary soft wood fastened in position with a plywood, willow or beech hoop.

Cases are also made in plywood by different methods of construction. Wire stitching is used for small, light boxes up to about 20 lbs. capacity. For stronger boxes,

clasps, metal tabs and light deal framing are employed. A standard type of plywood export case is made with metal edging throughout, the only wood battens being on the lid, over which the metal edging is folded and nailed for closing the case. This type of case effects a considerable saving on the overall measurements, which is often a most important point for export purposes.

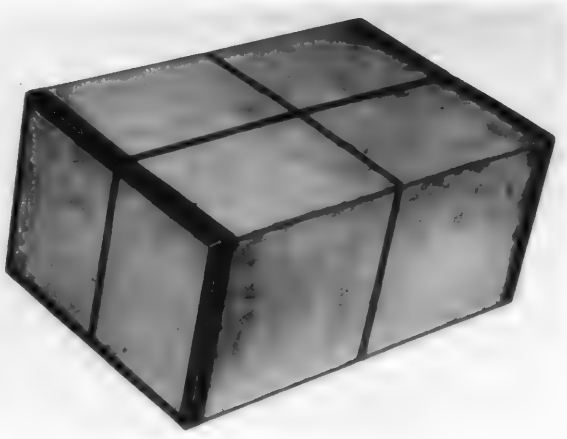
The principal advantages of plywood packages, both cylindrical and rectangular, are lightness, strength, endurance, cleanliness and absence of shrinkage and a clean surface. Ordinary wooden boxes, however, made on one or other forms of interlocking corner principle, with single-width sides may have crevices due to shrinkage. While the light softwood case is cheaper than the plywood case for the same capacity, the plywood case is competitive with the heavier battened case. Further, the softwood case is approximately 35 to 45 per cent. heavier than a plywood case of the same capacity.

Regarding the effect of plywood containers on the flavour of foodstuffs, while manufacturers sometimes specify that containers shall be odourless, there are very few timbers that are absolutely odourless, and the cost often makes their use for cases somewhat prohibitive. It may be assumed that all timber has its own peculiar odour. Plywood therefore is not exceptional in this respect, though a certain amount of the odour it possesses is due to the various processes of manufacture. It is possible to treat wood partially to deodorise it, but not entirely to remove all the odoriferous bodies. What odour does remain is, however, innocuous, and if the lids of containers are left off for a few hours before filling it quickly disappears. But when used for packing edible commodities, some form of lining, parchment or waxed paper is usually employed, whatever the type of container, plywood or solid wood, which is sufficient to prevent tainting of the contents.

The Veneer Cask

Although essentially employing the same wood as that used in the making of plywood, the Guelph Patent Cask is not a plywood container. The ordinary cask is made of two layers of veneer so placed that the joints in one layer are covered by the staves of the other layer. Hoops which are also of veneer may be varied in number and thickness according to the size of cask. Heads may be supplied in three pieces for easy fitting or single-piece three-ply heads can be fitted. Variations in the number of layers of veneer and of the thickness of the veneer makes it possible to construct a cask to meet almost any requirement. Even the thickness of the veneer in the staves can be varied as well.

The veneer cask is claimed to be stronger than the plywood case and, owing to the method of fastening, is more resistant to shock. At the same time, the veneer cask is heavier and generally somewhat more expensive than the equivalent plywood case. The veneer cask is suitable for carrying many different materials and possesses the minimum amount of odour for a wood container. It is supplied with various types of linings or lining bags. For fine powders the chimbs are filled with cotton cord to make the cask "siltproof".



A "No-Nail" case as described by the author.

The "No-Nail" Case

Quite recently another method of box making has been introduced into this country. Dispensing with all wood battens or strips and nails, metal binding only is used, and a collapsible nail-less box is the result. The method of construction is applicable to both plywood and soft woods, but its development has been mostly confined to plywood.

By this means a case can be produced combining lightness in weight with considerable strength. But the great advantage of this type of construction lies in the compactness for storage before use, the two sides, top and bottom being firmly sewn together by means of the teeth cut in parallel, angled metal strips fixed at each end of the box shooks. The four sides and two (separate) ends can be stored flat and assembled as required by folding together the sides and sliding the ends into the channels formed by the metal strips. This can be done quickly without special skill.

The case is secured by holding lugs that make it perfectly rigid and is closed by two metal fastenings provided on the metal strips. The closed case is thus completely metal bound and protected at the corners. The metal strip is lightly lacquered to prevent corrosion, and it can be bent twelve times through 90° before it will fracture. Simple extra fastenings can be added to reduce the possibility of pilfering and, in addition, a band of ordinary metal tension stripping is generally recommended.

Owing to the elimination of cleats and battens, the economy in freight costs is quite considerable, and, even compared with other types of plywood cases, this type of case is very competitive in price. Over long distances the reduction in freight charge may be sufficient to offset the cost of the case.

Liquid Proof Containers

A plywood barrel has been specially designed by one manufacturer for the packing of mincemeat and various other semi-liquids, and many hundreds of these kegs have been used with success. Owing to the double-walled method of construction the container is very strong, and

possesses a perfectly smooth and unbroken interior surface which is proof against leakage.

Linings for Barrels, etc.

Linings for barrels and casks may either take the form of an inner lining of the barrel or of a separate lining bag. Suitable materials for linings are cardboard, waterproof paper or tin. Bags may be made of greaseproof paper, parchment and greaseproof-lined kraft papers, foil and paper-backed foil. Manufacturers of cases supply the linings with the cases and will advise upon the most suitable material of which they should be made.

Other Developments

Other interesting plywood containers are fitted cases made for the hygienic handling of confectionery and other foods in the catering trade. These have been in use now for ten or twelve years and have proved very satisfactory. They can be obtained in several patterns to take trays for small cakes or to hold different sizes of large cakes. These trays and cases can be washed and dried without suffering distortion. A more recent development in plywood containers for the transport of foodstuffs is the insulated case for ice-cream now well established in design and service.

Pressed plywood boxes have only been used in this country for the packaging of cigarettes, and no other development appears to have taken place yet. They have, however, been used in other countries for chocolate boxes. The particular type of plywood used consists of very thin layers of wood less than a millimetre in total thickness, joined with an adhesive which percolates through the cells of the wood, making the finished sheet moisture-proof. The sheet is steamed and pressed into the shape of the box under heat, with the result that the surface acquires a distinct sheen. It is claimed that the boxes so produced are bacteriologically sterile. The boxes are light and strong, and lettering and designs can be embossed on lids and an inner lining of foil can be pressed in if required.

TOMATO SEED OIL

One of the by-products of tomato canning in *purée* and soup form is the residue containing skin and seed. Tomatoes give on the average 1·5 per cent. of their weight in seed. For a number of years this matter has had attention in Italy and the U.S.A., and it has been found that the seeds give an oil having several interesting applications and the oil cakes are useful for the feeding of cattle.

The treatment of tomato residues started in Italy as far back as 1910 and may be carried out by the following methods:

1. Shriver recommends expelling the greater part of the moisture by pressing. The residue is then dried and the dry material passed through a winnowing machine and sifted, thus separating the seeds from the skin.

2. Fachini uses a different method by which the seeds are separated from the residue without drying. The residue is stirred in water and allowed to settle. The seeds fall to the bottom and the skins remain on the surface. After separation, the seeds are dried by winnowing.

The extract of the oil is effected either by pressing or by means of a solvent. Extraction by pressure is the simpler method, requiring no complicated plant. The oil thus obtained contains few impurities, and those that are present may be readily removed. However, the cakes still contain 1 to 2 per cent. of oil.

The extraction by solvent can be done with benzene, petrol, ether, or tetrachloride of carbon. The latter is generally preferred on account of its non-inflammability. It renders possible the extraction of practically all the oil. The operation takes place in continuous extractors.

The cakes are used for the feeding of cattle. That part of the residue separated from the grains during winnowing or drawing off makes an excellent manure. The raw oil obtained by pressure or by extraction by means of a solvent can be used as it is or purified before use. To purify, the oil is treated with a current of vapour until deodorised. It is then decolourised by heating with kaolin and filtration through filter paper. The oil thus purified is straw-coloured.

Tomato seed oil is a good edible oil, and is used as salad oil in Italy. For this use it is treated with an alkali and subsequently with fuller's earth. It is also suitable for soap-making, and also for paint manufacture. It is generally classed as semi-drying. MM. Brambilla and Balbi have studied the possibility of using the oil of tomato seeds in the paint industry and have compared it with linseed oil and raisin-stone oil, which latter, however, is better for replacing linseed oil. Good results are obtained in making use of mixtures of 50 per cent. raisin-stone oil and 50 per cent. linseed oil, or 30 per cent. tomato seed oil and 70 per cent. linseed oil.—*La Revue des Produits Chimiques.*

Newsprint Beats Wheat

Newsprint has displaced wheat as Canada's leading export—a clear indication, if ever there was one, that the Dominion does not live by bread alone.

The fact is revealed by the trade returns for the six months ending September 30, which give the wheat exports at just under £12,000,000 and the newsprint at nearly £13,000,000—reversing the first and second places in the export list of a year ago.

The returns as a whole make the most encouraging reading. Export figures generally are soaring—the six months' figures run to over £113,400,000 as compared with £97,300,000 for the same period last year—and there is every indication that when the financial year is over they will have exceeded the £200,000,000 mark. Small wonder that the Canadian Government is showing a substantial surplus.

A short note on

THE IMPORTANCE OF *p*H CONTROL IN THE MANUFACTURE OF GELATINE AND GLUE

By C. H. S. Tupholme

THE WORKING properties of gelatines and glues—*e.g.*, viscosity, water-absorption, melting point, solubility, jelly strength, etc.—are all materially influenced by the *p*H of their solutions. Not only this, but the speed of hydrolysis of collagen into gelatine, and of the subsequent degradation of glue and gelatine (when dissolved for use) into proteoses, etc., is also a factor of *p*H.

Gelatine and glue are not definite chemical entities, and are both influenced not only by their inherent variability in composition but also by the presence of salts and other impurities which may shift the intensity and incidence of the always important *p*H factor. Gelatine has points of maximum swelling at *p*H 2·4 and at *p*H 11·6 for the external solution in which the gelatine is immersed. It has a point of minimum swelling at *p*H 4·7, its isoelectric point. Between *p*H 4·7 and 7·7 there is very little swelling, but there is a second point of minimum swelling at 7·7, which has been the subject of much discussion.

In the manufacture of gelatine and glue, the character of the product is greatly influenced by the *p*H value, which must be controlled if a product of high quality is to be obtained. After washing to remove salts which repress swelling, the stock is soaked in lime-water to remove mucins and to swell or "plump" the collagen. After washing out the excess of lime, the balance must be very carefully neutralised, since the *p*H of the stock when boiled exercises a great influence on the quality of the resulting gelatine or glue.

In hydrolysing the collagen to gelatine, the rate of hydrolysis is least at a *p*H of 4·7 to 6·0, but, on decreasing the *p*H to 3·0-4·0, the hydrolysis becomes very rapid. Increasing the concentration of alkali also increases the hydrolysis, but less rapidly. The decomposition of gelatine to proteoses, peptones, etc., by a secondary hydrolysis is not excessive between *p*H 3·0 and 8·0, but beyond either of these limits it becomes high. Long periods of heating or higher temperatures considerably increase the rate of both primary and secondary hydrolysis. While maximum swelling occurs at *p*H 2·4, it is obviously impractical to bring the acidity to this point in actual operation.

Hydrolysis during evaporation of gelatine is primarily dependent on the *p*H value, being lowest at the isoelectric point of *p*H 4·7. Also at any given *p*H value hydrolysis is directly proportional to the temperature and duration of heating.

Much gelatine is now purchased on a definite *p*H specification which varies for different uses. Since the clarity and jelly strength may vary somewhat with the *p*H, the importance of this is apparent. As an example, gelatine to be used in an ice-cream mix will have to function at the *p*H of the mix, usually about 6·3. Obviously such gelatine should be tested for colour, clarity, and jelly strength at this *p*H if the test is to be of value.

Glue which has a *p*H value of about 4·7 has relatively little adhesive power. Recent experience has shown this to be the cause of considerable trouble in sealing cartons. When the *p*H was raised by the addition of alkali, to bring the *p*H to about 7·0, the difficulty disappeared.

Hungarian Work on Flour

THE 1937 report of the Széchenyi Scientific Society of Budapest contains several references to work on foodstuffs. The most important would seem to be the process of Professor M. Vuk for improvement of flour without the use of chemicals. It is claimed that this flour yields about 7 per cent. more bread and makes the use of potato flour superfluous, but the chief claim is that the flour is ready for immediate use and does not require to be stored for several months. The economic savings in warehouse charges may thus become important if the process is adopted. Apparently these advantages are also attained if ordinary flour is mixed with only 5 per cent. of its weight of flour improved by the Vuk process!

Practical application of the process in Hungary has been hindered by the existence of a serious decrease in flour exportation in recent years: from 268,000 tons valued at 106 million pengös in 1929 to 49,100 tons valued at 9,600,000 pengös in 1934. Existing circumstances apparently demand continued encouragement of the export of grain, even if that should further reduce the amount of wheat exported as flour.

It is also claimed that bread made from flour treated by the new process retains its freshness for an unusually long time. For this reason night work in the bakery "will be rendered unnecessary, which from a social point of view is a long-felt desire".

FOOD POISONING

Elliot B. Dewberry
M.R.I.P.H., M.R.San.I.

In this, the second part of the series which began last month, the author discusses food allergy and its symptoms and also deals with the contamination of food by poisonous metals.

A section of the food research laboratories of the British Food Manufacturers' Research Association.

Food Allergy, or Sensitisation to Certain Foods

IT HAS long been recognised that many persons are unable to consume certain foodstuffs, even in very small quantities, without exhibiting some characteristic and/or disagreeable symptoms. Physiologically, this peculiar and interesting sensitivity or idiosyncrasy to particular foods, termed "food allergy",* which is fairly common and sometimes of a more or less serious nature, is primarily due to the constitutional condition of the individual concerned and not to the result of eating unwholesome foodstuffs.

The foods which commonly produce these allergic reactions usually contain proteins or are protein in nature, and include a large number and variety of articles of diet, such as eggs, milk, cheese, fish, shell-fish, oatmeal, potatoes, pork, strawberries, mushrooms, etc., or a combination of several of these commodities. Rarely is a person sensitive to only a single food, but generally to a group of similar foods. Rowe, who studied the subject extensively, found that next in frequency come chocolate, cabbage, tomatoes, oranges, cauliflower, bananas, walnuts and carrots. The symptoms resulting from allergic reactions may be mild or severe, and include nausea, vomiting, migraine, urticaria, erythema, eczema, or gastro-intestinal disturbance and certain types of malnutrition. The onset of the illness may be sudden or delayed some hours, and very mild reactions, which are the commonest, sometimes produce such slight symptoms that their true nature may be overlooked.

Foods to which an individual may be sensitive do not always produce the same manifestations. For instance, one may cause an urticarial rash, and another a gastro-intestinal disturbance. Occasionally the mere handling of a certain foodstuff, such as flour (or even drugs), by very sensitive persons is sufficient to set up localised reactions, particularly skin affections, such as eczema. Special exposure enormously increases the incidence of sensitiveness.

Unfortunately several of the above-mentioned symptoms, which vary considerably in individuals, are often present in various types of food poisoning, especially isolated cases with gastro-intestinal symptoms, which are more likely to be due to food allergy than are large outbreaks, thus adding to the complexity of the whole subject.

* *"Allergy" is a general term applied to any alteration in the reaction of the living organism to foreign chemical substances.*

Idiosyncrasy

Food indiosyncrasy, commonly present in infancy, tends to grow less as age advances, but it may be acquired at any time during life as a result of excessive consumption of some particular or unusual food, such as mushrooms, strawberries, etc. In 1928 Ratner suggested that under certain conditions an infant with an allergic predisposition may be sensitised before birth by the mother's over-indulgence in certain protein foods. The condition may or may not be hereditary and there appears to be a considerable difference of opinion on this point, though hypersensitiveness exhibited towards certain foods is frequently present in parent and offspring. An inherited tendency to become sensitive to certain foodstuffs may show itself at any time after birth, but it does not necessarily follow that descendants will suffer from the same allergic manifestations as their antecedents. The tendency to become sensitive, however, is no doubt transmitted from one generation to another. Lesne and

Wax containers in the process of proofing.

(*Courtesy of Mono Containers, Ltd.*)

Mr. P. Bruce White, who, with Dr. Savage, compiled the Medical Research Council Reports Nos. 91 and 92. In 1926 (alone) he wrote *Further Studies of the Salmonella Group.*

Richet in 1913 mentioned a case where idiosyncrasy to eggs existed in four generations.

In infancy great difficulty is frequently experienced in feeding, and this is increased by the presence of a sensitisation to common foods such as milk, eggs and even human milk; cases of urticarial rash and eczema in children may be frequently due to food allergy. Children showing an idiosyncrasy to cow's milk can often drink goat's milk with impunity. A definite history of dislike for some particular food, or of disturbances caused by them, may sometimes suggest the presence of this hypersensitive condition.

Regarding the general issue of milk to schools, Kennedy remarks that "the widespread drinking of milk by school children and others may yet have to be considered in the light of food allergy". A characteristic feature of food idiosyncrasy, especially in young children, is the tendency for one reaction to be replaced by another. It is quite possible for an infant with severe urticarial rash to outgrow this manifestation and in later years to become subject to gastro-intestinal symptoms. In certain individuals the periods of sensitivity may be separated by periods of lessened sensitivity when they are comparatively free from attacks. In some persons the abnormal condition may gradually become continuous, while in others the reactions may actually disappear altogether in course of time.

Dodgson (Report on Mussel Purification—Ministry of Agriculture and Fisheries, 1928) described an attack of "Musseling" he had when a young man. About twenty-four years later he again ate mussels with the intention of recording the symptoms. Nothing however happened.

Hypersensitivity

Although the real cause of food allergy is probably not fully understood, the abnormal condition has been generally assigned to individual hypersensitiveness to foreign protein substances circulating in the blood. It is well known, as a result of experiments, that the injection of protein substances into man and animals may at times set up poisonous symptoms. Some hold the view that this hypersensitive state may be due in the first place to an abnormal permeability of the intestinal mucous membrane which allows the unaltered proteins to pass through in an unchanged state, and in this way gain access to the blood stream. The condition resembles in certain respects the condition known as anaphylactic intoxication, which is presumed to be an exaggeration of the normal defence of the body against proteins and bacteria through the agency of the processes of digestion. Savage remarks: "The hypothesis that these cases of food idiosyncrasy are a variety of anaphylaxis is based on the supposition that in the individuals who exhibit the condition there is a marked hypersensitiveness of the action of particular proteins in these special foods, that they gain access to the circulation as unaltered protein and that the symptoms caused are due to individual intolerance of their presence in the blood. There are strong arguments which suggest this as the true explanation. In the first place the symptoms induced, including the rapidity of onset (allowing time for absorption from the alimentary canal), the minute dose required and the lesions caused, resemble in many ways those recognised as symptoms of anaphylaxis".

Cases of Hypersensitivity

It may not be out of place to quote one or two interesting and illustrative cases of hypersensitivity to certain common foods. The first, recorded by Talbot in 1916, deals with milk. Reactions due to proteins in this food are fairly common. A healthy baby which was breast-fed till it was 8½ months old was given cow's milk and barley water without any ill effects. This was stopped for a few weeks, but when cow's undiluted milk was added to the diet, the child vomited and showed decided symptoms of illness and within an hour its body was covered with an urticarial rash. Substitution of goat's milk for the cow's milk at once stopped the trouble.

Cases of hypersensitiveness to egg albumen frequently occur and several typical instances have been recorded.

In 1912 Coues described a case where a child about one year old was given the white of an egg, which immediately caused nausea and vomiting. About eight months later the child was again given white of egg. Violent sneezing and all the symptoms of an acute cold in the head followed, an extensive urticarial rash appeared on the body and the eyelids became œdematous. The temperature remained normal and there was no marked prostration.

Kennedy recently recorded a peculiar case of allergy in a woman caused through the consumption of chocolate. She had recurring eczema on various parts of the body, but was otherwise healthy. When put on a special diet the eczema completely disappeared within a fortnight. Later the eczema recurred and strict enquiry revealed that she had eaten chocolate. Warned not to do so again, her skin got quite well and she was able to take all foods. A piece of chocolate was then given as a trial with the result that the eczema reappeared.

Lefevre, in 1930, described a case of illness in a soldier which may have been due to sensitisation. After eating pineapple he showed symptoms of vomiting, pain in the stomach and finally lost consciousness. Two others who partook of some of the same pineapple were not affected. This type of food indiosyncrasy has been described on several occasions. In 1916 McBride and Schorer collected particulars of sixty cases of food sensitiveness causing skin trouble, such as urticaria and erythema. Fish, tomatoes, cheese and eggs were among the foods causing urticaria, and cereals and pork the erythema, the illness appearing within less than four hours after consumption of the food. Tomatoes and cereals generally produced these conditions in less than one hour, the eruption lasting from one to twelve hours and in a small percentage of cases lasting from one day to one week.

The Contamination of Food by Poisonous Metals

Chemical poisoning is comparatively rare in this country. There is no doubt, however, that the salts of poisonous metals do occasionally find their way into foodstuffs. Normally, vegetable and animal foods contain minute traces of many elements, and analyses have proved that at times such metals as copper, arsenic, iron, etc., are found therein, but usually only in very small amounts. Chapman and Lindon proved the presence of arsenic in marine crustaceans and shell-fish, and came to the conclusion that the arsenic was derived from the sea-water. Samples collected from the Thames and Medway each averaged about one-fortieth of a grain per gallon.

The eating of certain fish, such as plaice, which may contain the metal up to three parts per million, leads to the appearance of quantities of arsenic in the urine within 24 hours. Whether such forms of arsenic are really poisonous to human beings is a matter for investigation.

The rôle which metals play in food is a complicated one. It is a well-known fact that they may combine with the proteins in food, thus neutralising any poisonous effect and rendering the food more or less harmless, except when the metallic salt is present in excessive amounts. This probably explains the reason why some individuals exposed to metallic poisoning show no symptoms and are able to ingest and eliminate quite large amounts of metal which would possibly cause illness in other persons. Like all other kinds of food poisoning, the susceptibility or idiosyncrasy of the individual is of considerable importance.

Owing to the widespread use of metals in the food industry, many manufactured products, during preparation, come into close contact with machinery and containers during cooking, processing, storage, transportation and distribution, and there appears to be little doubt from the work of analysts that a certain amount of metallic contamination does occur, the degree usually depending on the length of time the foodstuff remains in contact with the metal. It may, however, be said that as a result of modern chemical and biological researches, manufacturers are now realising the great importance of the precautions that must be taken during the handling of all such apparatus, especially the limitations to be placed upon the storage of foodstuffs in contact with metals. Moreover, these researches enable selection of

The late Professor A. Gaertner, who discovered *Bacillus enteritidis* in 1888.

Lacquering tinplates emerging from the oven in the prevention of contamination.
(Courtesy of The Metal Box Co., Ltd.)

suitable equipment to be made for use in factories and other places where food is manufactured, prepared and stored. This has resulted in the introduction of pipes, tanks and other apparatus lined with glass, or other special materials not subject to ordinary corrosion by the product which may be brought into contact with them, thus reducing metallic contamination to a minimum. Doubtless, at the same time, the increased public interest has affected the general attitude towards foods. Manufacturers appreciate the necessity for hygienic methods in preparing and handling foodstuffs and the importance of protecting them from contamination, so that they may reach the consumer in the best possible condition.

Canned Food

Formerly cans were made by hand and solder was used for sealing the top, sides and bottom. Thus metallic contamination was likely to take place. In the manufacture of modern cans, however, no solder comes into contact with the contents; it is only applied on the outside, the ends being put on by means of a metal to metal seam with a thin layer of rubber compound between, the effect of which is to prevent contact with any lead from the solder, so that the only contamination that can take place is from the tin and iron.

During the process of tinning it appears that it is not possible to obtain an absolutely perfect coating on the steel sheets (the amount of tin does not usually exceed 2 per cent.), consequently precautions have to be taken to prevent interaction between the containers and its contents. In some canned meat and fish products, protection from contact with the can and consequent discoloration is obviated by using paper liners.

Scientific Research

With regard to contamination of canned fruits and vegetables by tin, this has been thoroughly investigated at the Campden Research Station, and as a result of the valuable work performed by this Station the use of lacquers has been universally adopted by British canners. There still remained the problem of corrosion of the plate at the site of pinholes in the lacquer. Very encouraging results were obtained from cans in which the second coat of lacquer is sprayed on after the tins are made up, and thus any scratches in the first coat of lacquer which exposes the iron are covered by the second coat.

In 1934 it was recommended that one method for obtaining improved protection was to spray the interior of cans made from twice-lacquered plate with a third coat of a quick-stoving lacquer. Trials with English fruits which normally give trouble were carried out on these lines with results showing a decided advantage.

In the Food Investigation Special Report No. 44, 1936, it is suggested that in all probability the corrosion of cans by foodstuffs will eventually be overcome by improvements in lacquers and methods of lacquering. Failing such a development, relief must be sought through improvements in the tin coating, in the steel base, in the cold storage of canned goods and in the application of knowledge concerning the corrosion of tinplate.

The metals usually associated with the contamination of food are arsenic, antimony, copper, lead, aluminium, tin and zinc. It has been suggested that metallic salts may reach foods in the following ways:

(*a*) Accidental mixing of the metal or its salts as illustrated by contamination of sugar with arsenicals during shipment, preparation of food in containers of unknown origin, etc.

(*b*) By solution from utensils in which it has been handled or processed, such agents which might add a deleterious metallic salt.

(*c*) Added to the food for some special purpose, as the use of lead arsenate sprays for destroying insects on fruits and vegetables.

Arsenic

Probably no metallic contamination of food is of so much interest or importance as that of arsenic. It is present in sea-water and the soil, thus gaining access to both animal and vegetable products which go to make up the human diet. Arsenic often occurs as an impurity in many chemicals which are used in one way or another in the food industry, consequently it is easy to understand that contamination of food at times is liable to take place. Traces of the metal have been found in jams, sweets, lemonade, liqueurs, sugar, treacle and syrups, which commodities are largely manufactured from glucose. The use of glucose as an admixture or an adulterant is open to serious objection, unless it is known to have been prepared with acid freed from any arsenical impurity. At one period it was common for sweets to be coloured with arsenical pigments, but under the Public Health (Preservatives, etc., in Food) Regulations of 1925, the use of metallic colouring matters and compounds of certain metals in food is forbidden.

Arsenic has been the cause of food poisoning on several occasions, and one of the most notable outbreaks occurred in 1900 at Lancashire, Cheshire and Staffordshire, where some 6,000 persons were poisoned by the presence of arsenic in beer, 70 of the cases proving fatal.

The Commission appointed to investigate the outbreak recommended that the arsenic content of substances used in food manufacture should not be greater than 1/100 grain per lb. (=1·4 parts per million) for solids and 1/100 grain per gallon for liquids, the arsenic being expressed in terms of the oxide As_2O_3. It may be mentioned in passing that Wynter Blythe states that "the smallest single dose of solid arsenic said to have proved fatal to a human being is 0·16 grm. (2½ grains)."

The Spraying of Fruits and Vegetables with Poisonous Insecticides

From time to time arsenic has been found in excessive amounts in the wrappings and skins of imported pears. In one case ⅜ of a grain per lb. was present in the wrappings and 1/12 of a grain per lb. in the skins. In 1926 samples of apples were taken for analysis. Five of the samples of Jonathan apples imported from America were found to contain arsenic, in each case more than 1/100 grain per lb. Samples of English apples were found to be free from the metal. Again, the results of

(*Continued on page* 54.)

THERMOPHILES

and their Importance to Canners

By L. H. G. Barton, B.Sc., A.I.C.

Part II.

In part one were given the results of a number of examinations which have been made on various raw materials purchased in England. This concluding article outlines the methods which are employed in such examinations.

THREE KINDS of media are used for the determination of thermophiles. For "flat sours" dextrose tryptone agar is used, for "swells" liver broth, and for hydrogen sulphite formers sulphite agar. Since starches are examined only for flat sours and swells only two of the above media will be required.

Starch Examination

Preparation of Sample.—20 grams of the starch are placed in a dry sterile Erlenmeyer flask and sterile cold water added to the 100 ml. mark with intermittent shaking. The whole is then well shaken in order to obtain a uniform suspension of the starch in water.

Detection of Flat Sour Spores.—10 ml. of the above suspension are transferred by means of a large-bore pipette to 100 ml. of tryptone agar contained in a flask. Care must be taken that the starch suspension is under constant agitation during the pipetting operation. The agar is at a temperature of 130° to 140° F., and after the addition of starch the mixture is placed in boiling water in order to thicken the starch. This takes about three minutes. The flask is then autoclaved at 5 lbs. for 10 minutes and during cooling it is gently agitated. Violent agitation must be avoided as air bubbles would be incorporated in the medium and would subsequently interfere with the reading of the plates. When the mixture has cooled to about 50° F. it is poured into five plates, where it is allowed to harden to the maximum degree. At this stage the plates are stratified with a layer of plain 2 per cent. agar. This stratification is known to be partially effective in combating "spreaders", though it is not completely successful. The plates are incubated at 55° C. and counts are made after 24 and 48 hours. The final count is after 48 hours.

Flat sour colonies are characteristic. The colony is round, measures from 2 to 5 mm. in diameter, presents a typical opaque central "spot", and, due to the production of acid, the colony is usually surrounded by a yellow halo in a field of purple (brom-cresol purple is the indicator present in the agar). There may be other colonies

Tubes showing formation of gas from thermophile anaerobes. Control tube on extreme right.

which are not of the acid-forming type. If these are counted together with the acid-forming colonies the total colonies on five plates is the number of thermophiles in 2 grams of the starch. This is multiplied by five to give the result in terms of 10 grams of starch. This is the total thermophilic spore count. The flat sour spore count is the sum of the acid-forming colonies on five plates multiplied by five.

Sometimes the plate is so thickly seeded that the whole of the indicator changes to yellow, due to the large amount of acid produced. In this case it is not possible to differentiate between total thermophilic spore count and total flat sour count. Greater dilutions may be taken in preparing the starch sample for examination and the total number of colonies may be reduced in this way.

Detection of Swells.—20 ml. of the original starch suspension are transferred to six liver broth tubes, the distribution being as even as possible. The tubes are then inverted and shaken violently a few times until starch and finely divided liver are in suspension. The tubes are next placed in violently boiling water for a full 15 minutes' period, and if the water is boiling vigorously enough the starch and liver are kept in suspension by the agitation and the former gelatinises. [NOTE.—The inversion of tubes and their violent shaking causes wetting of the cotton-wool plugs, but they soon dry out in the 55° C. incubator before any contaminating growth could penetrate them.]

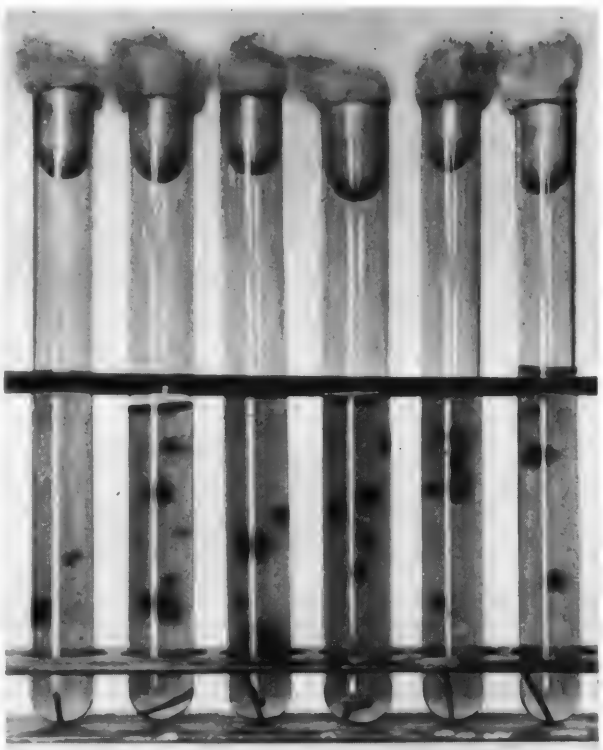
Each tube is layered with a vaseline paraffin wax layer, which is allowed to set. A stratifying layer of 5 ml. of plain 2 per cent. agar is then introduced, and the tubes are transferred to the 55° C. incubator for 72 hours. Positive tubes show gas production, which results in the plugs rising in the tubes. Sometimes the finely divided liver is also carried to the surface of the broth by the gas produced. The results are returned as so many positive tubes out of six.

Sugar Examination

The methods for the thermophilic examination of sugar are very similar to those described for starch, but variations are due to the fact that sugar is completely water-soluble whereas starch gives an opaque suspension. It is for this reason also that hydrogen sulphide formers are determined in sugars but not starches.

Preparation of Sample.—20 grams of the sugar are dissolved in 100 c.c. of solution (using sterile water) in a sterile Erlenmeyer flask (150 ml.). The solution is brought quickly to the boil and boiling continued for five minutes. Any losses due to evaporation are made good with sterile water. [NOTE.—It is advisable to scratch the 100 ml. mark on the flask to facilitate the above operation.]

Detection of Flat Sour Spores.—Pipette 2 ml. of the prepared sugar solution into each of five petri dishes. Cover the inoculum with 10 ml. quantities of dextrose tryptone agar and mix. Allow the agar to harden and stratify with plain agar, as described for starch. Incubate for 48 hours at 55° C. The combined count from the five plates multiplied by five gives the number of spores per 10 grams of sugar.



Sulphide formers in iron sulphite agar.

Detection of Swells.—The method employed is exactly as described for starch.

Detection of H_2S Formers.—20 ml. of the sugar solution are distributed approximately equally among six tubes containing sulphite agar. The tubes of media should be freshly exhausted by placing them in a water-bath of boiling water before inoculation. After inoculation the tubes are incubated at 55° C. for 72 hours. The presence of sulphide formers is indicated by the formation of blackened spherical areas. The dark colour is due to the formation of iron sulphide. These black "spots" may be counted and the result calculated to the number of 10 grams.

Preparation of Media

Dextrose Tryptone Agar (for Flat Sours).—The formula for this medium is as follows:

Bacto-tryptone	10	grams
Bacto-dextrose	5	,,
Bacto-agar	15	,,
Brom-cresol purple ..	·04	gram
Distilled water	1,000	ml.

All the ingredients except the indicator are dissolved in all the water and steamed in a steamer to facilitate the process. This takes approximately an hour. The whole is filtered through paper pulp and the reaction adjusted to *p*H 6·8 with brom-thymol blue. Brom-cresol

purple is added. 100 ml. quantities are transferred to suitable bottles and autoclaved at 15 lbs. for 20 minutes.

Liver Broth (for Swells).—500 grams of finely chopped beef or calf's liver are boiled with 1,000 ml. of water for 90 minutes. Most of the solid matter is then removed by straining through fine gauze and the volume is made up again with water to 1 litre. 10 grams of peptone are added and 1 gram of potassium or sodium hydrogen phosphate (K_2HPO_4). After adjusting the *p*H to 7·0, 5 ml. quantities are tubed and a small quantity of the finely ground boiled liver is added to each. The tubes are autoclaved at 15 lbs. for 20 minutes.

NOTE.—Care should be taken to remove any fatty portions from the liver, as fat causes trouble by the production of turbidity.

Iron Sulphite Agar (for H_2S Formers).—

Sodium sulphite	1·0 gram
Ferrous sulphate	·01 ,,
Sucrose	30·0 grams
Yeastrel	3·0 ,,
Agar	15·0 ,,
Distilled water	1,000 mls.

The yeastrel and agar are dissolved in the water and the process is facilitated by steaming. The ferrous sulphate, sucrose, and sodium sulphite are then dissolved. The reaction is not adjusted in this case and about 10 mls. are placed in tubes. At the time of tubing a clean iron nail is placed in each tube. The tubes are plugged and autoclaved at 15 lbs. for 20 minutes.

This medium should be used within one week of preparation owing to oxidation of the sulphite. Comparative tests have been made by the National Canners' Association, Washington, D.C., to determine whether nutrient agar can be substituted for yeast-water agar as a base for sulphite agar. The yeast-water agar was found to be superior and substitution by nutrient agar is not recommended.

These methods are those which have been evolved by Bigelow and Cameron of the National Canners' Association, with certain modifications which have been found more satisfactory by the writer.

It is hoped that English suppliers of raw materials will initiate investigations into the thermophilic content of their products so that the sources of infection may be located and dealt with, and more satisfactory materials for canners thereby become available.

Presentation at Arthur Holden & Sons Ltd.

Mr. A. Ll. Matthison.

IN pursuance of an old custom of the firm an interesting little ceremony, at which Mr. A. Ll. Matthison presided, took place in the mess-room at Arthur Holden and Sons, Ltd., on December 21, when three employees, with a minimum of 40 years' service each, were presented with gold watches and cheques.

The three employees, Messrs. T. O. Gorton, second head varnish maker, A. Locke, foreman in the varnish department, and F. Barlow, paint grinding department, made suitable acknowledgment and recalled many of their experiences with the firm.

In particular, Mr. F. Barlow was in very reminiscent mood, and gave details of the time when, in 1890 to 1895, the varnish department was at Bradford Street, and the paint department was at Bournbrook. The last-mentioned department was driven by an old waterwheel, and frequently the production of paint had to be stopped while the wheel was cleared free from weeds and leaves.

At the conclusion of this ceremony a surprise was sprung upon Mr. Matthison when Mr. Pope, varnish maker, supported by Mr. Cooke, chief chemist, made a presentation to him which had been subscribed for by the whole of the staff and employees of Arthur Holden and Sons, Ltd. It was recalled that Mr. Matthison had himself served the company for no less than 43 years, during the course of which he had brought much honour to himself and the company; the offices he had held included the Presidency of the National Food Canning Council, and recently he has been honoured with the Presidency of the National Federation of Associated Paint, Colour and Varnish Manufacturers of the United Kingdom.

The gift took the form of a reading-lamp, together with a full set of Dickens and an album containing the signatures of all the subscribers. A cut-glass flower vase was also presented to Mrs. Matthison. Mr. Matthison, who was obviously very deeply touched by this unexpected gift, made suitable acknowledgment.

Less Imports of Foreign Ham and Bacon

IN a Report dated March 5, 1936, the Import Duties Advisory Committee recommended that increased duties be levied on imports of ham and bacon, preserved in airtight containers, into this country.

Upon receipt of this report H.M. Government discussed the situation with the principal foreign supplying countries with a view to reaching a decision on the matter. Now arrangements have been made which, while they do not at the present adopt the I.D.A.C.'s recommendation of increasing the duties on foreign ham and bacon, do effect the reduction of imports to a level which should enable United Kingdom manufacturers to secure a fair share of the home market. If, however, the anticipated results do not eventuate, the voluntary arrangements which have been made will in all probability be replaced by the Committee's original recommendation of increased duties on foreign ham and bacon.

ANALYSTS' MEETING

An Ordinary Meeting of the Society of Public Analysts and other Analytical Chemists was held at the Chemical Society's Rooms at Burlington House on Wednesday, December 1, 1937, the President, Dr. G. Roche Lynch, in the Chair.

The following were elected members of the Society: H. F. Bamford, B.A., C. R. Bond, M.Sc., F.I.C., F. A. Dawson, B.Sc., John Hawthorne, B.A., Ph.D., F.I.C., G. Moses, A.M.C.T., F.I.C., M. Robinson, B.Sc., A.I.C., J. L. Wilson, M.Sc., F.I.C.

Certificates were read in favour of the following Candidates for Membership: J. E. Byles, B.Sc., F.I.C., W. M. Dowson, B.Sc., A.I.C., A. M. Fill, J. F. Hirst, B.Sc., F.I.C., T. W. Jackson, B.Sc., A.I.C., R. L. Kenny, B.Sc., A.I.C., A. J. Lindsey, Ph.D., M.Sc., A.I.C., F. A. Lyne, B.Sc., A.I.C., C. B. Moon, A.I.C., J. W. Tullo, B.Sc., F.I.C., J. N. Vickers, B.Sc., A.I.C.

The following papers were presented and discussed:

The Detection and Determination of *p*-Hydroxybenzoic Acid in the Presence of Salicylic Acid. By S. G. Stevenson, M.Sc., B.Pharm., F.I.C., and J. Resuggan.

The Contamination of Whale Oil with Fuel Oil. Parts I and II. By E. R. Bolton, M.I.Chem.E., F.I.C., and K. A. Williams, B.Sc., F.I.C.

The Analysis of Glucose-Fructose Mixtures, with special reference to Honey. By C. R. Marshall, Ph.D., A.I.C., and A. G. Norman, M.Sc., D.Sc., Ph.D., F.I.C.

Here are abstracts of the last two papers:

The Contamination of Whale Oil with Fuel Oil. Parts I and II. By E. R. Bolton, M.I.Chem.E., F.I.C., and K. A. Williams, B.Sc., F.I.C.

Part I. The authors describe how the recent advances in the production of whale oil, and the use of fuel oil in the ships concerned, have led occasionally to the contamination of the whale oil with traces of fuel oil of the order of 0·01 per cent. in spite of all precautions. They describe in detail the method they finally adopted for the detection and estimation of these traces. It ensures the complete removal from the whale oil of all but the contaminating fuel oil, and depends upon treating the unsaponifiable matter, in a special and carefully described manner, with acetic anhydride in circumstances such that only the fuel oil is insoluble.

Part II. Confirmation of the presence of fuel oil may be obtained by passing a solution of the oil in petroleum spirit through a column of activated aluminium oxide. If 0·005 per cent. or more of the fuel oil be present, a dark ring forms at the surface, owing to the adsorption of asphalt, etc. This may be removed and treated further to differentiate it from the pale-coloured deposits left by uncontaminated whale oils.

The Analysis of Glucose-Fructose Mixtures, with special reference to Honey. By C. R. Marshall, Ph.D., A.I.C., and A. G. Norman, M.Sc., D.Sc., Ph.D., F.I.C.

A procedure for the direct determination of glucose and fructose in mixtures is described, involving hypoiodite oxidation for glucose, followed by a micro-copper reduction method for fructose. The behaviour of these sugars in a mixture is not precisely additive, and no constant correction can be applied for fructose oxidised by the hypoiodite. From the analysis of known mixtures equations have been derived for amounts of glucose and fructose within the limits 0·40 to 0·08 g. of each. The presence of small proportions of sucrose is without effect on the method. Examples of results obtained with some typical honeys are given.

Food Poisoning (cont. from page 50)

investigations on English, Canadian and American apples showed 11 of 24 samples to be free from arsenic, 9 contained traces and 4 appreciable amounts.

There are no regulations in this country dealing with the spraying of fruits and vegetables with poisonous insecticides, but the United States of America has devoted much attention to the subject and to the reduction of arsenic on fruit to less than 0·01 grain per lb.

From time to time suggestions have been put forward regarding methods for the removal of the poisonous residue on fruits caused by spraying. It has been found that brushing and wiping will not remove arsenical compounds, but by careful washing in solution of hydrochloric acid (strength from 0·125 to 2 per cent.) its removal can be effected. The fruit is afterwards washed in running water to prevent injury by the acid.

The United States Bureau of Entomology and Plant Quarantine is carrying out a search for a substance which shall be as effective as arsenical preparations without the disadvantages which the latter possess. "Phenothiazine" is one substance which is said to give promising results, and experiments are being made to ascertain whether in practice it will prove a satisfactory and hygienically unobjectionable substitute for arsenical preparations.

Antimony

The salts of this metal, which is widely distributed in nature and a powerful poison, are seldom a cause of food poisoning, but several outbreaks have been recorded both at home and abroad, due to cheap enamelled-coated utensils which have yielded up a sufficient quantity of antimony to cause serious illness. Three such outbreaks have occurred in this country—in Newcastle-on-Tyne (1928), Folkestone (1929) and in London (1932)—and were caused by lemonade made from lemons or lemonade crystals which had been prepared or stored in enamelled jugs or pails. The citric or tartaric acid dissolved out dangerous quantities of antimony from the utensils, causing illness in a large number of persons in each outbreak.

It would appear that during recent years antimony oxide, being cheap, has been widely used as an opacifying agent in place of tin oxide. Antimony pentoxide, while safe as an enamel ingredient, owing to its very slight solubility in acids, becomes reduced during enamelling to the poisonous trioxide which is easily soluble. The remedy is to have an enamel matrix insoluble in acids because of a sufficiency of silica which encloses the oxide particles.

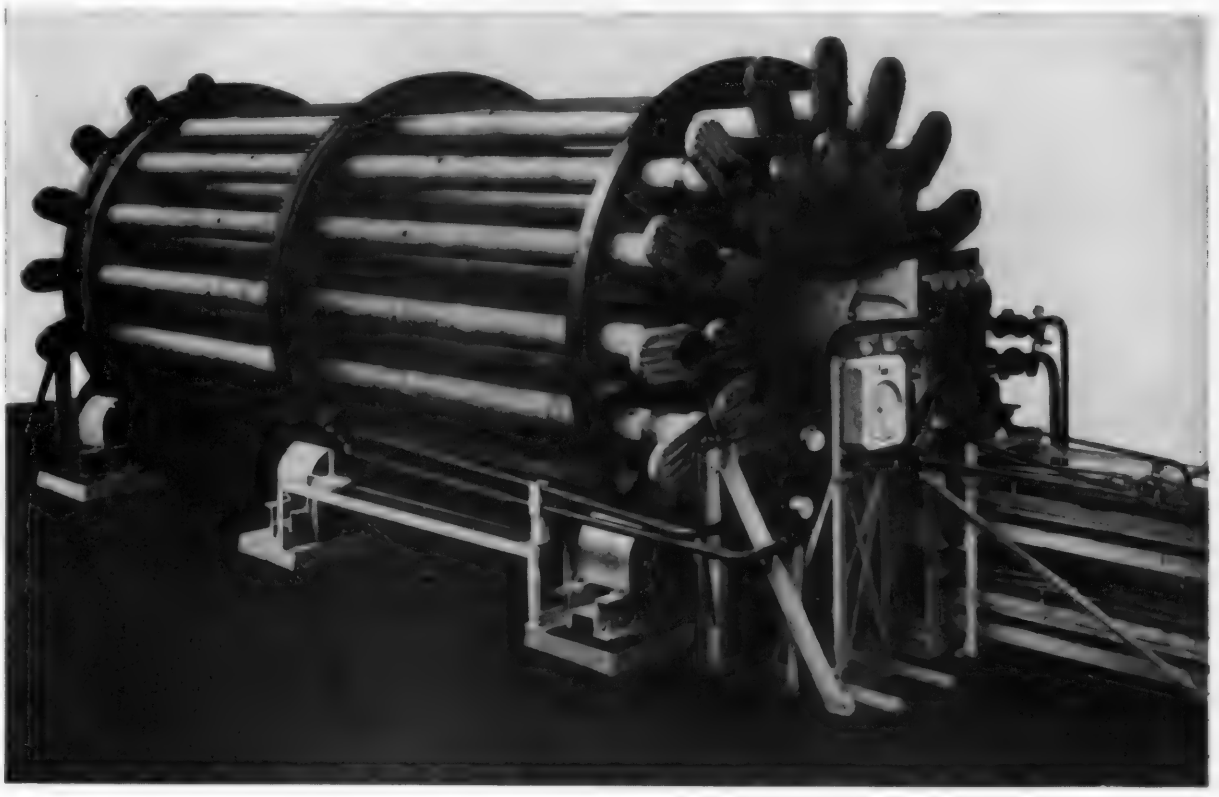
From time to time the Ministry of Health issued pamphlets in which attention was drawn to the possible danger of antimony due to the use of enamelled vessels with acid drink, like lemonade. In 1934 a pamphlet (No. 73) by G. W. Monier-Williams on *Antimony in Enamelled Hollow-ware* was also issued by the Ministry of Health, in which he summed up the situation as follows: "The recent outbreaks of poisoning are attributable to the presence of relatively large amounts of antimony trioxide in enamels low in silica and therefore soluble. The enamel matrix was disintegrated by the acid and the antimony oxide dissolved. There is reason to believe that almost all enamels containing antimony give up small amounts of the metal to foods, and it is

(*Continued on page* 66.)

CORNED BEEF PROCESSED AUTOMATICALLY

New Automatic Cooker Handles any Shaped Can

Specially Communicated



ONE OF the most significant improvements in the direction of equipment in the canning industry has been the introduction of the automatic cooker, or, more appropriately described, the automatic retort.

In the canned meat industry, especially that of corned beef, the round can has not succeeded in ousting the "taper" can. This is mainly because, with the taper can, considerable compression is effected by the "collapse" of the sides of the can. When the can is filled with meat, the sides and bottom of the can bulge. When the vacuum is applied, the sides and bottom spring back to concavity. With the round can, there is no possibility of obtaining compression by this means, although meat packs are in some cases filled in them, where compression is not an important item or where solidity is obtained by the presence of gelatine.

Up to date, the large manufacturers of corned beef use the standard type of retort for their processing operation. The large output necessitates large batteries, in some cases as many as 40 retorts being used.

Besides the cost of the retorts, the almost universal adoption of automatic control involves additional expenditure. Much hand work is involved. The cans are loaded into baskets; the baskets are placed on trolleys, and run into the retorts. After the processing operation is finished the retorts are opened, the baskets are removed, and the cans discharged to enter the can-washing machine.

In considering a fully automatic retort for corned beef cans, there are several fixed requirements. Such a machine would be obliged to have the capacity of handling irregular shaped cans. The time of processing must be sufficiently long. Many manufacturers will not admit of a processing period, for a 12-oz. taper can of corned beef, under 2½ hours. Others use a considerably longer period. The highly compressed state of the product greatly affects heat penetration, and damage to the product is less likely to ensue by over-processing than in the case of fruit and some vegetables.

L.C. Engineering Supplies, Ltd., have recently per-

fected a machine which is designed to comply with the special conditions aforementioned, in addition to many others, but we are told that this new machine does not supersede their standard Automatic Retort, which is claimed to be the ideal plant for the dairy world.

During the protracted experimentation necessary to evolve such a machine, the primary idea which was always foremost was that it should as nearly approximate to the standard retort as possible, while eliminating the inevitable handling inseparable from it.

The final design consists of a series of tiny retorts, having the elasticity enjoyed by the standard retort, *in that any sized or shaped can may be handled*. Processing time may be adjusted to provide for any normal processing, and the capacity merely depends upon the number of units incorporated.

The machine is made up of a series of tubes passing through drums, which are mounted on suitable rollers. Each tube is actually an independent retort, rotating past loading stations at which they are charged with cans. At the other end of the machine the cans are discharged. Each tubular retort is fitted, at both ends, with a slide valve operated by a simple mechanism.

The drums carrying the tubular retorts are rotated by a geneva gear and are ingeniously charged by two parallel rams which, in their turn, are fed by means of a travelling belt running alongside.

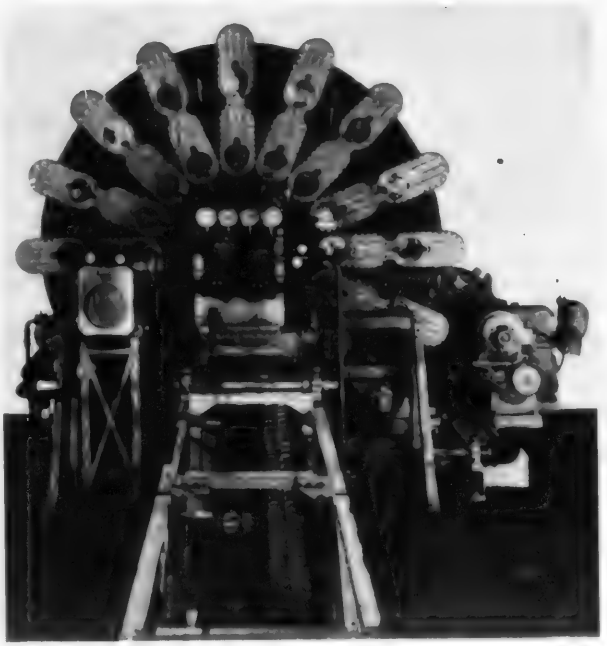
The main rotary supply valve is located at the forward end of the machine for delivery of steam, air, and water, or other media, under pressure to the retorts.

The operations are as follows:

The geneva gear stops the machine when two retorts come opposite the charging rams, the valves at both ends being open. The ram slowly conveys the cans into the retorts and at the same time ejects those cans which have already been processed; it then withdraws, leaving the charge of cans within the retorts. The machine then rotates; the tubular retort valves are closed and steam is admitted from the main supply valve. The introduction of steam, air and water follows standard practice in operation with the ordinary stationary retort and may be varied as to times, pressure and temperature. The whole process is automatic and thermostatically controlled.

Once the retorts have completed their cycle and are opposite the charging rams once more, these come forward, discharging the cans on a moving belt and leaving, as has been described, the fresh charge in the retorts.

The size of the machine will depend entirely upon the requirements of the canner. That shown in the illustrations is a 32-retort, three-drum model, suitable for handling the comparatively long processing of corned beef, but almost any conceivable processing conditions may be complied with by simple modification of the principle.



The outstanding advantages of the machine may be summarised as follows:

1. There are no internal working parts.
2. The simplicity in design permits the machine to be built to accommodate the varied requirements of the trade.
3. Any size and shape of can may be handled.
4. With certain simple modifications, glass packs may be handled.
5. A considerable saving of operation costs.
6. Speeds of feed may be arranged to meet any canner's requirements.

The elasticity of the machine may be gauged by the fact that if desired, it may be adapted for sterilisation by water. This method is being used increasingly for glass packs. No automatic cooker has hitherto been devised to handle these packs, and from this angle the new machine should have considerable appeal to British and foreign producers of preserves in glass.

The machine is covered by world patents.

Nickel-Chromium Stainless Steel in Meat-Handling Plant

In the Chicago stockyards considerable changes have recently been necessitated by the decree of the United States Government prohibiting butted and bolted construction of sheet metal equipment, and requiring welded assembly. An interesting example of some of the modifications made is provided by the new beef-slaughtering plant of Armour and Co. Two stainless steel chutes, the tops of which (on the fifth floor) are approximately 17 ft. apart, converge to a triangular formation on the fourth floor and abut on to a stainless steel table at which Government inspection is made. From this table satisfactory material again passes into the chutes for further disposal. The stainless steel used for the chutes was of the 18/8 type.—*Sheet Metal Industries*, 1937, **11**, 570-1.

[*Reproduced from the London Film Production, Charles Laughton in "The Private Life of Henry VIII".*

The ART Of GOOD LIVING

by M. Andre L. Simon

President of the Wine and Food Society

DURING THE two hundred years of its illustrious and useful existence, the Royal Society of Arts has recognised and encouraged all arts save one, until to-day: The Art of Good Living.

I venture to hope that you will agree with me that the Art of Good Living is entitled to a place of honour among the arts of peace, the liberal arts and the moral arts. It may rightly be called an Art, since it seeketh to awaken in us, through our senses of smell and taste, the highest possible measure of awareness and appreciation of the charm, the beauty, the harmony of savours and flavours in intelligently, that is to say artistically selected, prepared and presented food and drink. And surely such an art deserves to be called the Art of Good Living, since it is in so large a measure responsible for our own well-being, as well as inseparable from the joyful and charitable practice of hospitality.

The Art of Good Living is a living Art: its body, that which all may see and many acquire, is called *Gastronomy*; its soul, that which giveth life to the body, a gift from heaven, which no money can buy, is a form of the living spirit of Charity; it is called *Hospitality*.

Gastronomy is the handmaid of Gaster-the-Belly, the handmaid, but not the slave. Whether we agree with Plato or not that Gaster-the-Belly is in truth the seat of the soul, we are bound to agree that we have to pay dearly for any neglect of this the most important organ of our anatomy. It is of the utmost importance that Gaster-the-Belly be properly looked after, since it is from the materials which it receives that it builds up and repairs tissues, keeps up the central heating of our body, its flues clear and its reserve batteries charged.

Nutrition

Gastronomy is not the one and only attendant upon which Gaster-the-Belly depends for due attention to its needs, but it is the most intelligent, hence the best. It is more genteel than the somewhat savage chucker-out—or chucker-in?—fellow called *Hunger*; it is also more efficient, because it is more understanding than the new science of *Nutrition*. The proper ministering to Gaster-the-Belly is without a shadow of a doubt the daily and most important concern of the great majority of men and women of all ages, creeds and races. But whilst all are anxious to serve Gaster-the-Belly, Gastronomy alone has the merit to know how to humour as well as to serve. Gastronomy alone concerns itself with the pleasure which food and drink can and should give to the associated senses of sight, smell and taste, quite as much as with protein, fat, carbohydrate and vitamin values.

Nutrition wins prizes at cattle shows and baby shows. Gastronomy wins smiles and double chins; also a measure of relaxation and contentment beyond the grasp of those who fail to take an intelligent interest in what they eat and drink.

Gastronomy speaks the language of common sense when it asks all, whether they be rich or poor, to make the unescapable daily business of eating and drinking an amusing and profitable hobby rather than let it become a dull duty.

There is neither pleasure nor profit, hence no justification, in dealing with our daily food as mere coal shovelled into the boiler. Our meals should mean both physical restoration and intellectual relaxation.

Gastronomy is sometimes associated in the minds of ill-informed people with excess, but excess is the hall-mark of fast living, as sure a road to damnation as good living is to salvation. Gastronomy is, on the contrary, intimately bound to moderation, the very reverse of excess. Outside the golden fence of moderation, proper appreciation becomes impossible. Nor must we confuse Gastronomy with high living. It is entirely opposed to it. High living is inseparable from extravagance, from rare and rich and costly foods and wines, from fatty hearts and enlarged livers. Gastronomy, on the contrary, teaches us to avoid not merely excess, quantitatively speaking, but hurried meals and unwise combinations likely to tax unduly the machinery of all those little friends of ours tucked away below the belt, ever ready to do their best by us, whether we consider them or not.

The Time Factor

When speaking of excess and moderation in the matter of both food and drink, there is a very important factor which is all too often overlooked. It is the time factor. Do not bolt your food and do not drink hastily. It is like the "Do not split infinitives" rule, one of the rules which it is never safe to break, even if we must admit that there are exceptions to this as to all rules. However moderate the amount of food eaten, however excellent the quality of the wine served with it, time must be given to the salivary glands to do their part in the preparation of the food for its welcome reception below, and for the gastric juices to come forth in sufficient quantities to deal adequately with the food sent to the stomach.

The quantity of food that we may eat and of wine that we may drink depends, naturally, upon age, sex, occupation, heredity, environment and other factors. It is for each one of us, when we reach the age of reason, to find out our own limitations, to stop when we have had enough and to part with the shortest delay possible with whatever we have been foolish enough to eat and drink in excess of our requirements. But there is no distinction of age or sex when it comes to the question of quality, nor is there any valid excuse for breaches of the only rule without any exception; whatever you eat and drink must be sound, must be of good quality. Food that is good to look at and good to the taste is all the better, but that is not nearly of such vital importance. Food may look beautiful, and its taste may be quite attractive, but that alone does not make it acceptable to Gastronomy. It must also and it must above all be absolutely sound and fresh. Food in an arrested stage of decomposition, out of cold storage, may be perfectly safe to eat, and it may be so skilfully prepared as to please the palate, but it is not up to the standard of Gastronomy. To Gastronomy, quality means the maximum of nourishment in the most attractive form, that is the most pleasing to eye, nose and palate.

Quality All-Important

Quality surely is all-important in Gastronomy, and yet it is not everything. Foods and wines of the highest quality in themselves may give us and our guests very little or even no pleasure; they may even do us but little or even no good at all, should they be given to us in wrong order or at the wrong time. This is what is known as the very important factor of suitability, the science of combining happily flavours and savours, liquids and solids. Suitability, unlike quality, is all exceptions. There are a few main, guiding rules, but as many exceptions as there are individual tastes and circumstances. Gastronomy willingly grants us a large measure of liberty when it comes to deciding what is and what is not the most suitable fare and wines, provided, however, that we do not let go altogether the helm of common sense, and that we do not throw overboard the compass of our instincts. Instinct is not always dependable as a guide, but it is a help. If one, without being told, no more thinks of playing a funeral march at a wedding than of wearing tennis shoes with full evening dress, it is simply because one knows instinctively that it would be wrong. Yet lapses from good taste in the matter of dress cause no injury whatever to either kidneys or liver or any of the other organs upon which our bodily health and sweetness of disposition depend to such a considerable extent.

What one may read in books about the harmony that should exist between liquids and solids, savours and flavours, helps us up to a point but not very far, since so much depends upon individual reactions, personal likes and dislikes, environment and a number of other factors which cannot be prejudged. There is but one way to avoid most sins against Gastronomy; it is to make mistakes and to remember them. Every day of our lives we have at least one opportunity of training our palate, of taking notice of whatever we happen to be given to eat and drink, however simple it may be. Then, it is up to us to remember what was unpalatable and what was to our taste; also what we liked very much at the time, but was followed by indigestion later; and chiefly what gave us pleasure at table and a better night's rest or a clearer head the next morning.

A meal should be constructed somewhat like a book, that is with a Foreword or Introduction to begin with, then the Story, the really important part, and lastly the Epilogue or Conclusion. Translated into the language of Gastronomy, this means that we should begin our meals with hors d'œuvre or soup, by way of Preface; then pass on to the meal proper, the most important part, short or long, as the case may be, but the part of the meal from which we are to derive the nourishment which we need; lastly, we finish with cheese or dessert, a pleasant and useful part of the meal, one that is intended to help us assimilate, or inwardly digest the "story".

Hors d'Œuvre

Hors d'œuvre, in their modern form, have reached us from China by way of Russia. The Chinese are far too highly civilised to press their point of view upon their friends; they place before them all they have prepared for their refection and entertainment, be it fish, fruit, meat or vegetables, all daintily arranged in small dishes which are promptly refilled as soon as necessary. Guests help themselves to whatever pleases their eye, just as they choose. The Russians have improved upon the Chinese way to this extent that they have made a Chinese puzzle of all sorts of small *canapés;* all manner of appetising mouthfuls or titbits serve as an introduction to the real meal that is to follow. The danger is that the variety and excellence of the Russian hors d'œuvre can be such that they tempt the weak and hungry to indulge in a manner that will ruin their appetite for the meal proper.

Hors d'œuvre should never be substantial. They should be vinegary and spicy. They are intended to stimulate the flow of gastric juices necessary to deal adequately with the "story" that is to come. They should also include a fair allowance of olive oil or butter, in order that the walls of the stomach may receive an oily cover that will protect them from too rapid penetration by the volatile ethers of the alcohol in wines and spirits. Nordic peoples swallow a tot or two of Vodka or Aquavit with their hors d'œuvre; Latin peoples drink a sharp, young white wine with theirs, a wine that will

clean the palate and leave it expectant and appreciative ready to receive the better wine coming with the meal proper. English people compromise, and they also patronise grapefruit, melon and all kinds of fruit, sweet or sweetened, which are not allowed as hors d'œuvre by orthodox Gastronomy.

Soups have the same mission as hors d'œuvre, but a different method of approaching it. They stimulate the salivary glands and the flow of gastric juices by their heat and seasonings, and they afford to the walls of the stomach the same oily protection through the cream and butter or fat in them. That is why cold soups are as much a heresy as iced melon, and this is also why it is quite wrong to serve at the same meal hors d'œuvre first and soup after. The classical method is hors d'œuvre for lunch and no soup; soup for dinner and no hors d'œuvre. With soup, which cannot be too hot, iced wine is both a gastronomical heresy and a real danger to our internal peace. The wine served with soup should be at the temperature of the room and of fairly high alcoholic content, such as a brown sherry or an old Madeira.

After the Preface of our hors d'œuvre or the Introduction of our Soup, comes the Story of our meal. It may be one of those short stories complete in one chapter or course, just one large grilled sole, for instance, with half a bottle of Chablis, or else a fair-sized broiled steak, with half a bottle of claret. Each is a complete meal in itself and better than fiction. But the same story may be told in two chapters; the same sole and Chablis may be shared by two friends, who will also share, as a second course, the same steak and claret. The number of calories may be approximately the same, but the diversity and variety of flavours and savours will have added to the enjoyment of the meal. There are combinations of foods and wines beyond count, but what matters is to remember that harmony is made up of contrasts free from jarring notes, and that we should aim at well-balanced, harmonious meals. If we are to succeed, we must remember that, whenever there is to be more than one course, the one that comes first should help as much as possible the one that is to follow. Boiled cod with egg sauce, for instance, may be quite acceptable and even enjoyable, but it cannot ever be exciting; it should be served first, with an inexpensive white wine of no real merit; it calms the appetite, but leaves the palate unimpressed. Then comes the roast duckling or lamb with a mature claret or burgundy which we can enjoy at leisure. Reverse the order and the harmony is broken, the meal unthinkable.

Cheese and Dessert

The closing pages of the book and last stage of the meal, cheese and dessert, add really nothing to the story, but they are its pleasing summing-up. They are not intended so much to supply further nourishment as to help the digestion of the meal, that is to say, its prompt despatch, just as the hors d'œuvre or soup helped at the time of its arrival. Cheese is a digestive and dessert is chiefly useful on account of the leisure which it introduces at the time when the stomach needs peace and quiet, in order to pass on the meal just received to the lower regions, where the cockle is to be separated from the wheat and cast into the exterior darkness.

Prologue and Epilogue may be dispensed with, or else they may take the place of the meal itself, on occasions. There is every possible opportunity for each one of us to choose whatever combination of wine and food which may appeal to us or to the friends whom we wish to entertain, within the broad rules which I have just outlined. They are merely very broad rules and given merely as a guide and a help in case of need.

One last rule which no disciple of true Gastronomy should ever overlook or ignore is Simplicity.

Abstract from a lecture given by the author before the Royal Society of Arts.

Distribution of Tin on Tinplate

THE quality of the tin coating on a tinplate is expressed commercially as the weight of tin spread over the surface of the sheets in a whole box of tinplates, but it is known that far from the tin being distributed in a coating of uniform thickness over the entire area, serious variations occur. In a recent paper before the Iron and Steel Institute, W. E. Hoare, B.Sc., classifies these variations in thickness according to whether they occur between one sheet and another as a whole, between one end and another of any particular sheet, or between points close together on a sheet. The paper has now been published by the International Tin Research and Development Council as Technical Publication Series A, Number 59. Discussing variations of the two latter kinds in relation to porosity it is shown that it is possible to establish a close connection between the weight of the coating and its porosity. The causes of the variations in thickness are deduced. The work confirmed the theory of Chalmers connecting the minimum pore diameter with the thickness of the coating. As regards variations at points which are close together these are due to grease lines, scruff bands, ripples and other defects. By a simple reflection method the surface of tinplate can be made to record photographically on sensitised paper the ridges and hollows and other surface peculiarities upon it. The accumulation of tin into such characteristic ridges may cause the thickness of the coating in the hollows to be only 60 per cent. of the average value. Interesting conclusions are drawn as to the effect of ridges upon porosity.

Copies of the above publication may be obtained free of charge from the International Tin Research and Development Council, Manfield House, 378, Strand, London, W.C.2.

This year's British
FOOD MANUFACTURE'S ANNUAL

A RECORD Fair is likely for 1938. The space taken at London and Birmingham now totals 852,000 square feet, which is 10,000 square feet more than the complete exhibiting area of 1937.

With fourteen other sections, the Foodstuff section at Earl's Court will show a marked increase in size over 1937. This is pleasing to note, showing as it does the great advances which have been made in this important British industry. A notable exhibit in the Foodstuff section will be brands of Norfolk cider specially matured in wood to ensure their withstanding the climates of other countries. This cider has a tradition of many centuries and is made from a secret blend of specially prepared apples.

Holland still leads the thirty countries from which buyers have already intimated their intention to visit the Fair. Belgium is second, closely followed by the Irish Free State, with France, Germany, Denmark, and Norway next in order.

At Castle Bromwich, Birmingham, where the five sections, Hardware, Building, Gas, Electricity and Engineering, are housed, everything from buckets to boilers and from pins to power plants will be exhibited.

In all, the products of 76 main United Kingdom trades will be shown at the B.I.F. in the three great exhibition halls —Olympia and Earl's Court, London, and Castle Bromwich, with its 15½ acres at Birmingham.

Of interest also is the fact that the Premier has consented to be principal guest and speaker at the banquet to be given by the Government at the Mansion House, by the courtesy of the Lord Mayor, on February 21 to mark the opening of the Fair. The President of the Board of Trade, Mr. Oliver Stanley, will preside.

Admission Periods

The Fair at Olympia and Earl's Court will be open each day between 9.30 a.m. and 7.30 p.m. from February 21 to March 4 (inclusive), except Sunday, February 27. These times are, of course, only for trade buyers who are admitted by a Trade Buyer's Badge, which is available throughout the period of the Fair and obtainable at the entrances (price 2s.) on presentation of the Department's card of admission or the buyer's business card. The public are admitted daily, on payment, from 4.30 p.m. to 7.30 p.m. (excepting Saturday, February 26, and Friday, March 4, when they are admitted throughout the day).

At Birmingham the Fair will be open to trade buyers, who will gain admission from 10 a.m. to 6 p.m. Here, however, the public are admitted throughout the day for the full period of the Fair, except February 27, without restrictions. Birmingham's period of opening is from February 21 to March 4, as at London.

Travel

Reduced fares are afforded to visitors to the Fair by the British and European railways and by many British and foreign shipping and airways concerns.

Eighteen interpreters are available; one is at Euston Station, one at Paddington Station, and a third at Olympia. B.I.F. kiosks, where visitors will be welcomed and given every assistance on such matters as accommodation, catalogues, badges and transport services, will be open at New Street and Snow Hill Stations at Birmingham.

LONDON

The exhibits to be shown at Olympia will include earthenware, stoneware, printing and stationery, scientific and optical instruments, electroplate, glassware, china, drugs and druggists' sundries, chemicals, etc. At Earl's Court will be the Empire section, foodstuffs and beverages, confectionery, etc.

Here is a list of exhibitors at Olympia who are well known in the food industry.

EXHIBITORS AT OLYMPIA

Paper, Printing and Stationery Section:	*Stand No.*
Adana Printing Machines, Ltd.	C 1038
J. L. Barnett, Ltd.	A 802
Block and Anderson, Ltd.	F 1312
British Cellophane, Ltd.	A 778
British Crepe Makers and Paper Products, Ltd.	B 927 & 963
John Dickinson and Co., Ltd.	B 952 & 973
T. B. Ford, Ltd.	A 790
Freeder Crepe Paper Mills, Ltd.	B 996
Lang Pen Co., Ltd.	B 997
Andrew Levy and Co., Ltd.	A 789
Livermore and Knight, Ltd.	B 933
Mansell, Hunt, Catty and Co., Ltd. ...	B 923
Arthur Sanderson, Ltd.	A 793
Transparent Paper, Ltd.	B 975
John Waddington, Ltd.	B 957 & 968

Chemical Section:	*Stand No.*
A. Boake, Roberts, Ltd.	A 634
British Drug Houses, Ltd.	A 674
British Fumigants, Ltd.	A 670
Detel Products, Ltd.	A 629
Hopkin and Williams, Ltd.	A 687
Howards and Sons, Ltd.	A 688
Imperial Chemical Industries, Ltd. ...	A 612 & 626
Monsanto Chemicals, Ltd.	A 631 & 668
Thomas Tyrer, Ltd.	A 666
Whiffen and Sons, Ltd.	A 627

Scientific and Optical Section:	*Stand No.*
Hanovia, Ltd.	A 656 & 660
Adam Hilger, Ltd.	A 613
Short and Mason, Ltd.	A 653
Smith's English Clocks, Ltd.	D 1151
The Tintometer, Ltd.	A 654

Pottery and Glassware Section:	*Stand No.*
A. James Jobling, Ltd.	A 770 & 783

General Section:	*Stand No.*
Gledhill and Sons, Ltd.	F 1318
W. Lusty and Sons, Ltd.	568
J. Peck and Co., Ltd.	68 & 69
Scottish Development Council, Ltd. ...	305
Viscose Development Co., Ltd.	A 735

Industries Fair

PRE-EXHIBITION REVIEW

BIRMINGHAM

Food manufacturers will find much interest in the many and varied machinery exhibits at Birmingham. Exhibits are grouped as follows: A, Hardware, Ironmongery, Brassfoundry; B, Building; Ca, Gas; Cb, Electricity; D, Engineering.

EXHIBITORS AT CASTLE BROMWICH

Hardware, Ironmongery and Brassfoundry Section:	*Stand No.*
British Emulsifiers, Ltd.	A 524
W. P. Butterfield, Ltd.	A 501
Follows and Bates, Ltd.	A 329 & 224
Arthur Holden, Ltd.	A 424
Metal Box Co., Ltd.	A 308
Midland Fan Co., Ltd.	A 614
Press Caps, Ltd.	A 504
Sellman and Hill, Ltd.	A 307 & 202

Building Section:	*Stand No.*
Ashwell and Nesbit, Ltd.	B 327 & 226
Aqua-Mellis Co., Ltd.	B 525
B.E.N. Patents, Ltd.	B 629
Benham and Sons, Ltd.	B 624
Cellactite and British Uralite, Ltd. ...	B 625 & 522
G. A. Harvey, Ltd.	B 329
Henry Hope, Ltd.	B 415 & 314
Mirrlees, Bickerton and Day, Ltd. ...	B 322
Mirrlees, Watson and Co., Ltd.	B 322
Pinchin and Johnson Co., Ltd.	B 619 & 516
Prior Burners, Ltd.	B 365 & 201
Ruberoid, Ltd.	B 313
H. C. Slingsby, Ltd.	B 419
Standard and Pochin Bros., Ltd. ...	B 420
Tett Bros., Ltd.	B 216
Valor and Co., Ltd.	B 401
Venesta and Co., Ltd.	B 605
Walker Crossweller and Co., Ltd. ...	B 303
Yorkshire Copper Works, Ltd.	B 717 & 630

Glass Section:	*Stand No.*
C. R. Averill, Ltd.	Ca 209
Grant and West, Ltd.	Ca 610
Oxley Engineering Co., Ltd.	Ca 715

Electricity Section:	*Stand No.*
Barrett and Elers, Ltd.	Cb 720
British Thermostat Co., Ltd.	Cb 700
British Thomson-Houston Co., Ltd. ...	Cb 507 & 405
Constructors, Ltd.	Cb 607 & 506
English Electric Co., Ltd.	Cb 611 & 510
General Electric Co., Ltd.	Cb 517
Gent and Co., Ltd.	Cb 515
Harper and Co., Ltd.	Cb 601
Higgs Motors, Ltd.	Cb 617
Johnson Matthey and Co., Ltd.	Cb 211
Pyrotenax, Ltd.	Cb 112
Radiovisor Parent, Ltd.	Cb 319
Rheostatic Co., Ltd.	Cb 411

Electricity Section (continued):	*Stand No.*
Rubery Owen and Co., Ltd.	Cb 705
Streetly Manufacturing Co., Ltd. ...	Cb 605 & 304
Wild Barfield Electric Furnaces, Ltd. ...	Cb 303 & 204

Engineering Section:	*Stand No.*
Edgar Allen and Co., Ltd.	D 719
Arens Controls, Ltd.	D 736
W. and T. Avery, Ltd.	D 515 & 412
Birmingham Battery and Metal Co. ...	D 607 & 506
British Oxygen Co., Ltd.	D 411, 312, & 212
J. Collis and Sons, Ltd.	D 221 & 120
Controlled Heat and Air Co., Ltd. ...	D 663 & 502
R. and J. Dick, Ltd.	D 213
Jackson and Crockatt, Ltd.	D 718
Ewart Chainbelt Co., Ltd.	D 503 & 402
Felco Hoists, Ltd.	D 103
J. H. Fenner, Ltd.	D 604
Firth-Vickers Stainless Steel, Ltd. ...	D 413 & 314
International Combustion, Ltd.	D 215 & 114
R. H. Lister, Ltd.	D 204
David Moseley, Ltd.	D 630
Newalls Insulation Co., Ltd.	D 521
Niagara Screens, Ltd.	D 308
Northey-Boyce Rotary Engineering Co., Ltd.	D 226
Revvo Castor Co., Ltd.	D 531
Ruston and Hornsby, Ltd.	D 467
Silvertown Lubricants, Ltd.	D 310
Spiral Tube and Compton Co., Ltd. ...	D 715
Stelcon (Industrial Floors), Ltd. ...	D 108
Tecalemit, Ltd.	D 415 & 316
Thomas and Bishop, Ltd.	D 233
Vacuum Oil Co., Ltd.	D 419
Walker, Jas., and Co., Ltd.	D 620
Wickman, Ltd.	D 408
Willmot Trucks and Products, Ltd. ...	D 423
Yale and Towne Manufacturing Co., Ltd.	D 203

F.B.I. Business Barometer

THE F.B.I. Business Barometer and Trade Forecast for the third quarter, 1937, has just been published by the Federation of British Industries.

The Editorial contains a study of some of the problems created by world re-armament and the conclusion is drawn that unless the increase of expenditure on armaments is relaxed, the peoples of many countries will be faced with a progressive reduction of the labour and materials available for civil requirements, leading to a further limitation of personal liberty and the impoverishment of their standards of life.

In the Forecast the opinion is expressed that the level of activity in trade and industry should continue to be well maintained, and that export trade should also continue to show improvement.

Book Reviews

British Standard Methods of Testing Gelatine

The British Standards Institution has just issued Standard Methods for Testing Gelatines.

These methods, which have been prepared by a representative committee, under the Chairmanship of Mr. R. Duncalfe, represent the experience of the gelatine industry over a number of years. Both purchasers and users have pooled their experience, and these methods have been selected, after careful trial, as those giving the most reliable and reproducible results.

The detailed methods given in this Standard include those for the determination of moisture, jelly strength, viscosity, melting point, foam, water absorption, solubility, keeping quality, pH, grease, ash, sulphur dioxide, chlorides, colour, clarity, arsenic and heavy metals. It is pointed out in the foreword that it will not be necessary in all cases for the whole of the tests to be carried out, but that the necessary tests will depend upon the purpose for which the gelatine is intended.

These methods include the testing of gelatines of edible quality utilised, for example, in the confectionery, table jelly, meat product and other food trades, as well as gelatines for industrial purposes such, for instance, as the paper trade, and also gelatines for photographic purposes.

British Standard Methods of Testing Gelatine (B.S.S. No. 757-1937). British Standards Institution, London. 3s. 6d.; 3s. 8d. post free.

A Valuable Addition to Nutrition Literature

This book dispels an existing fallacy that canned foods do not contain as high a vitamin content as that of fresh foods. However, it is shown that in the ordinary cooking processes of some foods, much of the vitamin content and calorific value is lost, while conservation is obtained with commercially canned foods.

It is well explained how, if foods containing vitamin C are canned by heat-processing in sealed containers, the anti-scorbutic factor is well retained instead of destroyed, as in normal domestic cooking processes. As vitamin C is the most labile of the vitamins, it is more subject to destruction through oxidation by atmospheric oxygen. However, in commercial canning practice this is prevented, and canned foods will thus retain a comparatively high vitamin C content.

Unenlightened persons are inclined to believe that when commercially canned foods are exposed to the atmosphere they must immediately be removed from the cans, as contamination of the foods might result from the standing. This mistaken viewpoint is dispelled after perusal of the first part of a chapter entitled "Public Health Considerations". Of course, foods containing acids of a corrosive nature should be removed immediately after opening, as corrosion of the can may take place with absorption of minute quantities of metal which may give rise to food poisoning.

One chapter is devoted to human dietary requirements, which includes such substances as carbohydrates, fats, proteins, calcium, phosphorus, iron and iodine. An excellent summary is given of our present knowledge of vitamins and their specific connections with canned foods. The vitamins, A, B, C, D and G, are considered together, with an historical and biochemical account of each.

The first part of the book is devoted to the chemistry and physiological importance of the canned foods themselves, while the second part concerns the manufacture, control and technology of the cans and the essential precautions necessary to ensure perfect preservation of foods in commercial canning.

An historical introduction to the practice of canning is included, and references are given to Spallanzani and Nicolas Appert, who are considered to be the pioneers of the heat-processing of food in sealed containers. Spallanzani in 1775 was the first man to make use of this process, but Appert is given credit for the first conscious use of it.

At the end of the book a comprehensive section of reference tables is given. Included in it are such tables as those giving the mineral, iodine, iron and manganese content of foods. One table, illustrating the composition of the whole range of canned foods and fruit products, occupies about 16 pages, while yet another table gives the vitamin content of commercially canned foods and the appropriate sources of information. Ten diagrams, illustrating the tinning, enamelling, flanging and soldering of cans is included, together with a table of thirty sizes of the various cans in use.

Finally, a bibliography containing a list of seventy-two references to literature is appended, and the whole text of the book is profusely illustrated with actual photographs of the processes carried out in the Nutrition Laboratories, Research Dept. of the American Can Company.

J. D. D.

Nutritive Aspects of Canned Foods. Pp. 112, with photographs. Published and issued gratis, on request, by the American Can Company, New York, U.S.A.

The Waxing of Fruit

WAXING oranges by spraying with a paraffin wax emulsion is part of the Brodrex process which is much used in America for treating oranges. Waxing by the Brodrex method is claimed to reduce wilting, improve appearance, and to reduce wastage. There are few independent results to support or disprove the claims. Nelson (*Calif. Citrograph*, XVIII., November, 1932, p. 6) found wastage of lemons reduced from 3 per cent. to 2 per cent. by wax treatment, but Camp, Gaddum, and Stahl (*Abs. Int. Bull. Refrig.*, No. 1, 1935, p. 54) found that the treatment had little effect on extent of decay or loss of water.

Young (proceeding 1st Imp. Hort. Conf., Part III., p. 560, 1931), Brooks, and McCollock (*J. Agric. Res.*, vol. 52, p. 319, 1936) report that waxing reduces low temperature spotting.

Apples are sometimes treated, especially in the dry areas where much washing is needed to remove arsenic sprays.

Waxing improves appearances, probably reduces wilting. If, however, too much wax is applied anaerobic conditions are set up and the fruit is ruined, and this is usually the result if paraffin oil is smeared over fruit. Hence the merit of waxing appears to lie in the amount put on.

Happy Event

MANY readers will join us in congratulating Mr. Keith Fraser, Business Manager of FOOD MANUFACTURE and other Leonard Hill Limited publications, on becoming a parent.

His wife, Marjorie, presented him with a daughter recently at "Ravenswood", Highgate Road, London; mother and daughter are doing well.

PLANT AND MACHINERY

Equipment varying from a tiny water pipette to a large rotary compressor, all designed for the food manufacturer, is described and illustrated in this month's Plant and Machinery Feature.

Red Reading Mercury

An ingenious device which consists of reflecting a red colour upon ordinary mercury makes the reading of the thermometer so equipped a simpler matter than usual. The makers, Industrial Thermometer Co., claim that it is "as clear as a stop light", and the sample received certainly endorses this claim.

* * *

Graduated Water Absorption Pipette

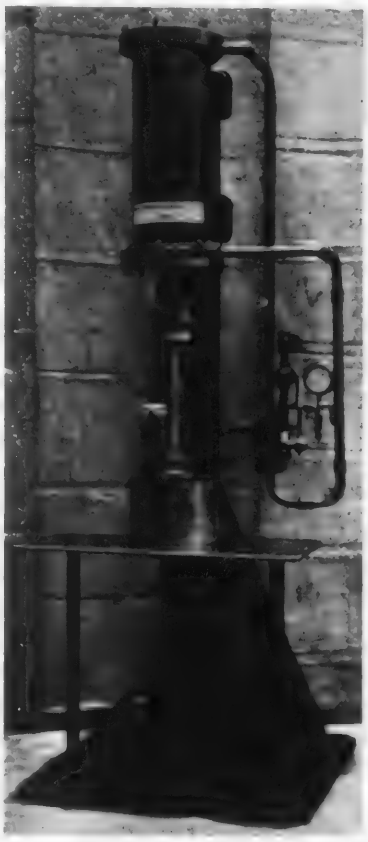
The estimation of the water absorption of flour is usually carried out on a 20 or 28 gm. ml. sample, the desired amount of water being delivered by a burette. As the addition of further quantities of water to a stiff dough after mixing is a matter of some difficulty, two or more tests may be necessary. The pipette illustrated has been designed by Mr. S. Walter Butterworth, B.Sc.(Tech.), A.I.C., Head of the Department of Bakery, College of Technology, Leeds, for flour tests of the type described. For mill and bakery work generally, and students' work in the bakery where laboratory apparatus may not be readily available, the graduated pipette is inexpensive and more easily handled than the usual burette. If 28 gm. of flour are used for the test, the reading in millilitres on the pipette may also be taken as water absorption in gallons per 280 lb. sack. (For comparative tests of an approximate nature 1 oz. [28·3495 gm.] of flour is sometimes used.) The pipette will deliver accurately any desired volume of water between 10 and 20 millilitres.

* * *

Quickfit Glassware

With seventy well-pictured, Spirax-bound pages, the new Quickfit and Quartz catalogue of laboratory glassware is a handsome and serviceable booklet from every point of view. Prices and details are up-to-date and are in operation as from January last.

The "Greenbat-Banquet" Hydraulic Ham Press



This patented press is specially designed and manufactured with a view to assisting meat canners and particularly ham canners to overcome what has in the past been one of the major difficulties in their trade.

The press in question is of the vertical single ram type working either off the water mains or from a combined pumping unit at a pressure of 60 lb. per square inch and the used water subsequently being stored for service purposes. By its aid, an operator can see at a glance the exact size of can required to contain each individual ham.

Output is greatly increased by the use of this press, and as many as 1,500 hams can be handled by one operator in a working day of nine hours. A further point which should be stressed in addition to the increased production is the great economies that can be obtained from the operation of this press, as with intelligent use each can is correctly filled and the "blown" appearance of the product in an over-filled can, and the suspicion which is inevitably engendered by the under-filled or "light" can, are entirely eliminated. Scrap cans due to collapse are practically unknown, saving in tinplate over a period is considerable as the correct size of can is always to the operator's hand, and one of the leading canners in this country who is using a "Greenbat-Banquet" press reports not only a considerable increase in production, but that cans unfit for despatch owing to improper packing have been reduced to the really remarkable figure of 0·75 per thousand.

Greenwood and Batley, Ltd., of Albion Works, Leeds, who are manufacturers under license for this patented press, will be pleased to furnish any further details which may be enquired for.

* * *

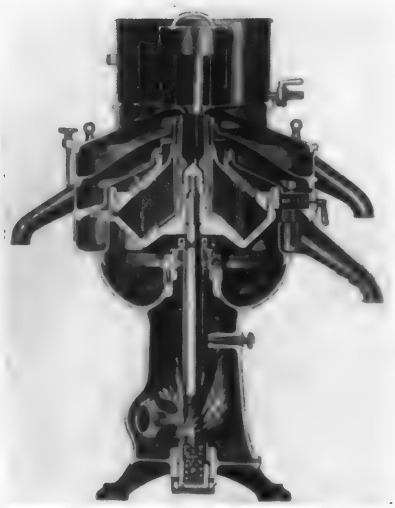
Magnetic Separation

The problem of metallic particles present in foodstuffs such as tea, coffee, cocoa beans, currants, raisins, cereals, etc., appears to have been solved by the "Rapid-Multi" magnetic separator, a machine which as its name implies extracts foreign metallic substances. It is made by the Rapid Magnetting Machine Co., Ltd., who claim for it an input rate of 9 tons of tea per hour, giving complete efficiency. Anyone who wishes, can see the separator in action upon making suitable arrangements with the firm at Magnet Works, Lombard Street, Birmingham.

* * *

Machine Tools

An interesting and well-illustrated booklet entitled "Machine Tool Economy", from Samuel Hodge and Sons, Ltd., sets forth the advantages of reconditioning machine tools. Old machines can be re-designed and refitted at their works, and this seems to be one solution of the problem of maintaining machinery in an efficient condition economically. Their booklet enlarges upon this method, and a copy will be sent to any interested firms.



This machine is used for the continuous separation of fish oil from liquid. It has been extensively used for the recovery of herring oil from glue water, but does not confine its operations to fish oils only. Continuous separation of starch and the discharge of solids which may be present in liquid are also within its scope. Alfa-Laval are the makers and call it the SVK 5 Clarifier.

New Packing Aid

It is well known that when finely powdered materials such as flour or crystals are first packed into containers they occupy less cubic space after they have settled. This is mainly due to the air being drawn in with the material and also to the irregularly shaped particles which form voids. C. H. Johnson and Sons, Ltd., have produced a machine which dispenses with the necessity for waiting until the material is settled before more space is made. The "Vibrogir" compactor, it is claimed, in less than five seconds obtains a settling down varying from 10 to 33 per cent. according to the material handled. Our illustration of this interesting machine shows a small model of the vibrating table, but it can be supplied in different sizes and to suit any purpose.

The hand-dryer described below.

Lancashire Dynamo and Crypto, Ltd.

This firm manufactures a large range of plant and equipment of interest to food manufacturers. Their four-in-one mixer is a machine for exemplifying in most attractive ways a product of British engineering skill and modern practice. Among other items figure the "Crypto" electric coffee mill, potato peelers, and chip cutters. For the butcher are a large selection of bowl cutters.

An attractive piece of equipment is an electric hand dryer which eliminates the unhygienic roller towel. Especially appropriate for factories, schools, and restaurants, it is designed to conduct two currents of hot air to a central point. The wet hands are placed between the two outlets, and a vigorous washing and rubbing motion employed. In less than half a minute the hands are dry and velvety. It is claimed that the skin is in no way impaired by the drying process, and chapped hands cannot result.

The Lancashire Dynamo and Crypto, Ltd., issue a series of attractive folders, which may be obtained by application to them at Acton Lane, Willesden, N.W. 10.

The "Vibrogir" compactor which gives up to 33 per cent. more space in a pack and which is comprehensively detailed in col. 1.

This small weighing machine, made by The Automatic Weighing and Packing Machine Co., is designed to weigh from ¼ to 1 oz. of tea entirely automatically at a speed of 35 per minute. It is specially made for filling small envelopes for restaurant use.

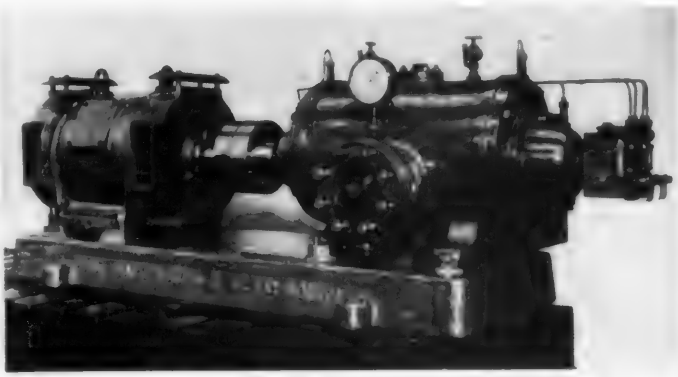
Streamlined Pulley Discs

Although the idea of closing in the sides of pulleys with discs or windage plates is a very old one, the practice has been used to a relatively small extent because the fitting of such plates to a pulley (not initially so provided) involved a considerable amount of work and was rather costly.

The advantages to be gained through the enclosure of the centre of a pulley are obvious. Reduction of air resistance and noise, due to the partial suppression of air eddies, are definite gains, but the chief advantages are in the minimised risk of entanglement from a belt which has become unshipped or broken, and the lessened accumulation of atmospheric dust and dirt within the pulley. The latter is a point of vital importance to factories engaged in the preparation of food products.

A new method of dealing with this problem consists of providing a set of adequately stiff enclosure discs, made in halves for easy fitting. These are supported from the arms of the pulley without needing any special skill in fitting or equipment for that purpose. There is no necessity for drilling or any other work whatever on the pulley itself.

This new arrangement, which forms the subject of a patent application, and to which the name of "Destron" discs has been given, has been developed by Douglas Lawson and Co., Ltd., the pulley manufacturers.



The rotary compressor described below.

Rotary Air Compressors

An efficient principle for the production of compressed air in food factories and similar establishments is to use high-speed rotary compressors, direct driven on the same baseplate by small steam turbines or electric motors, according to which is the most suitable for the individual conditions.

A typical example of the latest practice is a single-stage water-cooled rotary compressor that has been supplied by Hick, Hargreaves and Co., Ltd., used for conveying liquids through pipes. This is direct driven by an electric motor and runs at 720 r.p.m., taking 56 b.h.p. at the shaft, and having a duty of 655 cubic feet of free air per minute, which is discharged against a pressure of 20 lb. per square inch gauge.

The firm specialise on rotary compressors of this type, which may be either of the single-stage or the double-stage variety, and with or without water cooling. Also they may be used alternatively as vacuum pumps giving 95 per cent. vacuum with single-stage operation and 99·9 per cent. with two-stage.

* * *

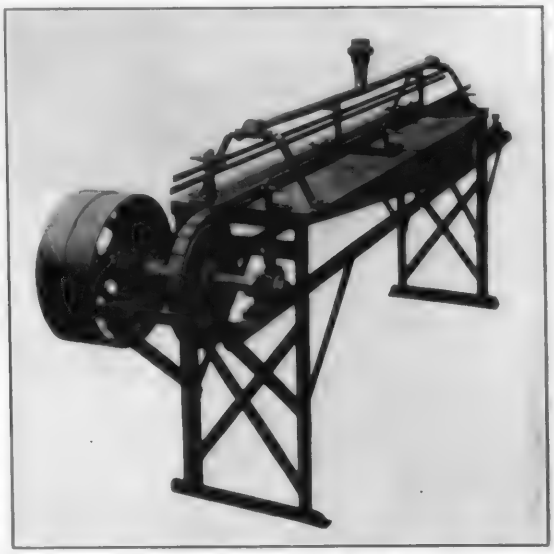
Black Smoke Prevention

In the operation of steam boiler plant, large or small, black smoke can be prevented by the use of sufficient intensity of draught combined with controlled admission of secondary air and correct thickness and distribution of fire. With exceptionally smoky coal blending with coke or low volatile content coal can be adopted. In addition, the furnace, whether hand or mechanically fired, must be so arranged that the degree of draught, as well as the amounts of primary and secondary air, may be varied within wide limits.

Of considerable interest for smokeless and efficient combustion of coal is the latest design of the "Turbine" forced draught furnace, suitable for any type of boiler, and operated by hand or mechanical stoking (on the sprinkler principle).

This is a production of the Turbine Furnace Co., Ltd., and consists of a series of large cast-iron trough fire-bars placed longitudinally side by side, say, five to six in number for an average 30 ft. diameter "Lancashire" boiler, forming a grate of any desired length, in which are fitted loosely a large number of small transverse bars. The forced draught is supplied either by steam nozzles, one in each trough bar, or by trunking and a small motor-driven forced draught fan. In either case the power required is small, not over the equivalent of 2½ per cent. of the boiler evaporation with steam jets, about the same as mechanical induced draught, and much less when a fan is used. Any desired intensity of draught may be obtained merely by operating a valve or switch, whilst any desired amount of secondary air can be admitted at the back of the grate to complete the combustion, using a control damper operated from the front of the boiler.

With this furnace the great flexibility in draught allowed means that the thickness of the fire can be adjusted to suit the quality of the coal, without reduction in efficiency.



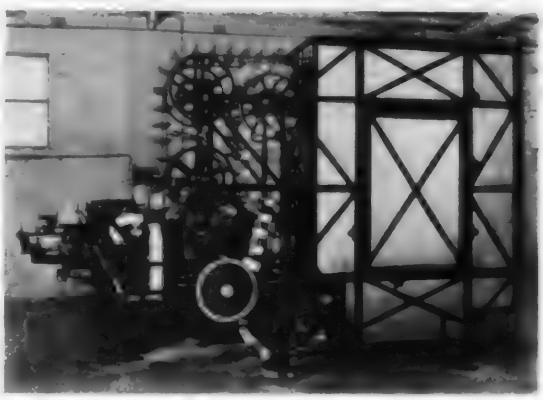
An automatic syruping machine with a conveyor chain of phosphor bronze. Syruping pipe is made either in aluminium or stainless steel and can be used for filling cans or jars. Product of G. C. Engineering Co., Ltd.

Packing without Straw

A saving in space and freight by the use of this new method of packing known as "Safetipack" is claimed by the makers, Compressed Paper Packing, Ltd. Made of moulded corrugated paper, this method dispenses of straw or wood-wool packing.

36 at Once

In one minute this machine produces 3 dozen completely made and waxed containers in one single automatic operation. It is the Hunter-Penrose "Granowski" patented automatic waxed paper cup making machine made by the firm of Hunter-Penrose, Ltd., of London.



Correspondence

B. Coli in Food Colours

The Editor.

SIR,

We notice in your January issue an article with reference to the discovery of *B. coli* in food colours, and are rather inclined to think that a chance remark of the lecturer in question has been taken a great deal too seriously by the Press.

The writer was present at the lecture in question, he referred to the matter verbally at the conclusion of the lecture, and afterwards wrote to the lecturer on the subject. The latter informed him that it was some years since he had experienced the trouble in question, that it was in two colours only—Yellow and Blue—that it had occurred, and that during recent times such contamination appears to have ceased to exist.

You will note that this reads rather differently from what you have put in your article, which we think is likely to lead to a lot of misconception and unnecessary panic in the trade. We have already received letters from one or two of our friends, asking us if we can reassure them on this point as far as our own colours are concerned, and, of course, we have not hesitated to do so.

We think that the contamination referred to must have occurred in colours made under very different conditions from those which obtain to-day, and we feel quite confident that so long as the right class of colours is bought from reputable manufacturers who are catering for the foodstuff industry, there need not be the slightest fear entertained of this trouble occurring.

We should be much obliged if you would give these few remarks the same publicity that you have given to the original in order to save a lot of quite unnecessary unrest in the consuming trades.

Yours faithfully,
p.p. WILLIAMS (HOUNSLOW), LTD.,
H. H. LOVELY.

MIDDLESEX.

Natural and Synthetic Vitamin D

The Editor.

SIR,

I do not intend to ask you to inflict on the readers of FOOD MANUFACTURE a controversy between my friend Dr. Ing. Emil Collett and myself, but it would be unfair to those readers if I did not point out that Dr. Collett seems to have misunderstood the point of some of my argument, and also the paper by Eliot to which I referred. Eliot and her colleagues not only compared three different forms of "vitamin D milk" but also examined the relative prophylactic effects of "synthetic" vitamin D (viosteral) and "natural" vitamin D from cod liver oil on a similar number of infants. It was on this comparison that relevant parts of my argument were based.

Incidentally, is it not time that we gave up using this quite misleading distinction between "natural" and "synthetic" vitamin D? The so-called "natural" vitamin D_3 has been made by irradiation in various laboratories and isolated in pure crystalline form by workers at Göttingen University. The so-called "synthetic" form of vitamin D, calciferol or vitamin D_2 is certainly what gives to the husk of the cocoa bean, to some moulds and to some samples of ergot their antirachitic activity. It is to bring added confusion to an already difficult problem to discriminate between "natural" and "synthetic" vitamin D. It would, however, be much more accurate, and substantially correct, to call calciferol and vitamin D_2 respectively "vegetable" and "animal" vitamin D.

Yours faithfully,
A. L. BACHARACH.

GREENFORD.

Citric Acid

The Editor.

SIR,

We notice in the November issue of your journal, in the article on the manufacture of Jelly Powders, by Mr. J. E. Thomas, on page 381, under the paragraph headed "Acid", it is stated that Citric Acid is generally conceded to be less crude upon the palate than Tartaric Acid, which consideration however may be offset by its greater cost.

Might we take this opportunity to point out that Citric Acid does not cost more than Tartaric Acid, and is at the present time actually cheaper and has been for quite some time.

Yours truly,
JOHN & E. STURGE, LTD.

BIRMINGHAM.

EDITORIAL NOTE.—*The article referred to the Canadian market, and at the time of writing Tartaric Acid was cheaper than Citric Acid.*

A Profitable Outlet for Blow-Fly Larvae

THERE is a small demand for blow-fly larvæ as fish bait used mostly in the Midlands. The method used for preparing the larvæ or "gentles" for sale is unique. Decomposed joints of meat (horse-flesh, etc.) are hung in barrels placed on the sheltered side of a remote field. In a few days the three-quarters grown maggots are brushed off and stored in troughs lined with clean fine sawdust and intermittently moved about. In twenty-four hours, the red or black contents of the alimentary tract, which must be got rid of before the maggot can be used as bait, will have disappeared. Most of the sawdust is sifted off and the gentles packed in tins and posted to their destination to serve as uniform bait in fishing competitions, etc.

One farmer in Buckinghamshire found that his yield of maggots was decreasing rapidly and he attributed this lack of prolificacy to too much inbreeding and consequent weakening of the strain of blow-fly. He bought a crate of frozen Australian rabbits, some of which had blow-fly eggs on them, and he hung these in the casks and allowed the maggots to reach the imago-stage. By this crossing of the strains he was able to recover his yield of robust gentles.

Food Poisoning (cont. from p. 54)

at least questionable whether the continued ingestion of these small amounts may not be injurious to health. It is suggested that total prohibition of antimony in hollow-ware might be found to be in the best interests of the public and of trade."

During 1934 an unusual case of contamination by antimony occurred in Japanese canned oranges. Some of the samples contained 0·14 grain of antimony per lb. (corresponding to 0·37 grain of tartar emetic). It has been suggested that the oranges became contaminated by being prepared in vessels coated with a soft antimony enamel.

The medicinal dose of a soluble antimonial salt should not exceed 1½ grains. A dose of 2 grains has proved fatal.

(*To be continued.*)

GENERALITIES

Malayan Tinned Pineapples

A recent report gives the total shipments of tinned pineapples from British Malaya for the period December 27, 1936, to December 4, 1937, as 2,391,298.

* * *

South African Maize and Wheat

Exports of maize from South Africa have been prohibited as from December 15. This is owing to the drought which has prevailed during recent months and the resulting possibility of a shortage of supplies for domestic requirements. Up to December 15 the exports are quoted as being 10,500,000 bags, which is about the same as the exportable surplus originally forecast by the Maize Control Board.

The latest estimate of the wheat crop, based on conditions existing towards the end of November, is 2,917,000 bags, compared with 3,260,000 bags for the previous forecast. This decrease is also attributed to the drought.

* * *

W. V. Guenigault Dies

Many in the food and allied industries will read with deep regret of the sudden death of Mr. Wilfrid Vernon Guenigault, manager of the essential oils and gelatine departments of Chas. Zimmermann and Co., Ltd., 9 and 10, St. Mary-at-Hill, London, E.C. 3.

Mr. Guenigault joined the firm in 1909, and continuously held that post until his death.

His genial and kindly personality made him both popular and much respected throughout the Trade, and his passing will be particularly regretted by his many friends. The executives of Chas. Zimmermann and Co. found him a valued and trusted friend.

Mr. Guenigault's principal hobbies were fishing and motoring. The funeral took place at Wanstead.

* * *

Official Announcement

The Department of Overseas Trade announces that His Majesty's Government in the United Kingdom have decided, after careful consideration, that it is not possible for them to accept the French Government's invitation to continue the United Kingdom participation when the Paris International Exhibition is reopened for a further period in 1938. The French Government have been informed accordingly.

The heavy apparatus laboratory in the new I.C.I. building described below. In the background can be seen a refrigerator, a mixing mill, a steamer and a drying oven. A small autoclave is shown on the middle bench, and a centrifugal separator in the foreground.

New I.C.I. Laboratories

An event of outstanding importance to the chemical and allied industries occurred on January 11 when Mr. John Rogers, a director of I.C.I., opened the doors of the new research building of the Dyestuffs Group, Blackley, Manchester. To mark this special occasion the actual opening was performed by chemico-electric means. Using a specially constructed key of alloys Mr. Rogers initiated a chemical reaction which resulted in the preparation of Monolite Fast Red D, a well-known pigment. The formation of this pigment interrupted a beam of light falling upon a photo-electric cell. This stopped the flow of a weak electrical current which in turn stopped a larger current in an amplifier which again operated a relay giving sufficient current to start a motor which slowly opened the main doors of the building.

The new laboratories, designed by Mr. Serge Chermayeff, have been necessitated by the rapidly expanding activities of the company in the field of large-scale organic chemical research, which has been continually extended beyond the sphere of dyestuffs proper into that of textile auxiliary products and even into the apparently unrelated fields of plastics, rubber, leather processing chemicals and pest control products, and it is intended that in the new laboratories the various extensive programmes will be centralised and co-ordinated. The present building is only the first section of a possibly long-term extension programme.

Heinz Strained Foods

H. J. Heinz Co., Ltd., have issued an attractive and well-produced booklet which tells about "the right food for baby"—*viz.*, Heinz Strained Foods. Its appeal is directed chiefly towards mothers, and the charming photographs of babies, which are a prominent feature, must surely assist towards this aim. The copy is non-technical and has a general appeal.

Another booklet, "Heinz Strained Foods for Infant Feeding and Special Diets", is a much more technical approach to the subject and includes an interesting and informative table showing the nutritive value of strained foods.

* * *

New Canteen for Morris Workers

A new canteen, capable of seating 500 people at once and equipped with the most modern kitchen apparatus, was recently opened at Morris Motors, Ltd., Bodies Branch, at Coventry. Mr. H. Seaward, Joint Managing Director, performed the opening ceremony in the unavoidable absences of Lord Nuffield and Mr. Oliver Boden, O.B.E., Vice-Chairman of Morris Motors.

* * *

Glasgow Showroom

Electrical food preparing machinery made by the Peerless Electrical Manufacturing Co., Ltd., will now be on view at a new showroom and service depôt of the firm at 126, Bothwell Street, Glasgow. This step has been found necessary to cope with the growing volume of "Peerless" business in Scotland.

* * *

The Metric System in Industry

A detailed examination of the use of the metric system and its further possibilities in the food industry is announced by the Decimal Association.

It is pointed out that the metric system is already in use in part in a number of industries. The Association would welcome the co-operation of any firms willing to supply information as to the application of the system in their own concerns. By such co-operation it is hoped to compile a comprehensive survey to be used in the Association's efforts to secure decimal reform for Great Britain.

The Decimal Association is now keenly supported by over 600 industrial concerns, including a number in the food industry.

Kellogg's New Factory

A five-storey factory with five huge grain silos adjacent is rapidly nearing completion at Trafford Park, Manchester. It is for the Kellogg Company of Great Britain, Ltd., and some idea of its size may be gauged from details concerning the electrical equipment which has been supplied by the Metropolitan-Vickers Electrical Co., Ltd. Four metal-clad circuit breaker units will control the supply of electricity, and then two 1,000 kVA transformers will transform the pressure from 6,600 to 400 volts. There will be approximately 230 electric motors of various sizes and types in this huge factory.

* * *

Silk and Glass for Tubes

The notion of a collapsible tube made not of metal but of glass and silk seems incredible, but the invention of a German engineer settles all doubts. The idea consists of ingeniously combining artificial silk and cellon glass by a new method so that an integral substance is formed. This is treated as would be aluminium or any other metal to make a collapsible tube.

The new tube is very light in weight, absolutely waterproof, and untearable. It will be exhibited at the Leipzig Packing Materials Fair.

* * *

Wall Finishes

In an effort to employ wall finishes that are durable and serviceable, manufacturers frequently ignore the decorative factor, and work in surroundings that are drab, to say the least.

A new finish introduced by John Ellis and Sons, Ltd., called "Emalux", has much to recommend it from the utilitarian point of view, and is certainly decorative. It is composed of 90 per cent. cement, and a glazed, enamel-like surface is obtained by treating it with a special solution. The surface is glass-hard, and is rippled to avoid glare; it will not scratch or peel, and is not affected by dilute acids.

Some beautiful colour combinations and mottlings are obtainable.

Echo of the Future

If it is at all possible to depict a place on paper, faithfully and comprehensively, then this has been accomplished by the London Press Exchange in their compilation of the facts about the Team Valley Trading Estate, in a 66-page, spirax-bound publication called "To-day's Industrial City of To-morrow". Practically everything that the business man would want to know about the Estate is clearly detailed in words and pictures. All the sections are thumb-indexed so that one may at once turn to the section of particular interest at the moment. There are twelve sections which include information about the site, local labour, capital, rent and rates, service, transport, and the natural resources of the Estate. This handsome and interesting book is free from the North-Eastern Trading Estates, Ltd.

* * *

Seiray Lamps

Seimens Electric Lamps and Supplies, Ltd., have recently issued a booklet on the subject of their Seiray Electric Discharge lamps. Cut-away pictures which clearly describe the lamps and illustrations in monochrome and full-colour of actual installations together with sizes and prices make this booklet an interesting addition to your library of trade literature.

American Trade Papers

For those firms in Great Britain and the Empire who do business in America, or who wish to keep in touch with American affairs, the *Blue Book* of Associated Business Papers Inc. is a very valuable piece of work.

It gives details of 154 of the leading American trade and business papers. Data is given about each paper, which makes clear the editorial objectives, the market survey, its editorial organisation and important facts relating to its circulation. An examination of some of these important and responsible journals, particularly with regard to their net page circulations, would be interesting reading to many British firms, and should help to dispel a lot of the nonsense that is talked about circulations of some British papers.

To anyone in business who is interested in the United States, this book would seem to be indispensable.

The address is 369, Lexington Avenue, New York City, and the book is $5.50, which includes the cost of postage. An international money order sent to this address will bring one of these valuable books.

* * *

Aluminium Information Bureau

The application of aluminium and its alloys in the food industry will be included in the scope of the first Aluminium Information Bureau in Great Britain, the foundation of which has just been announced.

Conducted by the Northern Aluminium Company, the Bureau will gather and co-ordinate all information regarding the uses and application of aluminium and aluminium alloys in the food industry, and will offer a comprehensive industrial and general enquiry service. The manager of the new Bureau is Mr. D. Cannon Brookes, M.A. (Cantab.).

* * *

Correct Dates

Owing to incorrect opening dates having been published by various news services, the Leipzig International Industries Fair have asked us to publish the following official correct dates.

The General Samples Fair will open from March 6 to 11, 1938, and the Great Engineering and Building Fair from March 6 to 14, 1938.

* * *

New 'Phone Number

On January 15, the telephone number of the London office of Thos. Broadbent and Sons, Ltd., was changed to Abbey 2484-5. Address is as before—25, Victoria Street, S.W. 1.

INFORMATION and ADVICE

Ice-Cream Powders—Heat and Vitamins in Canning—Iron in Water—Piping Jellies—Non-Setting Chocolate Mix—Sherman-Bourquin Units—Brick-built Brine Vats—Sugar and Caramel

Ice-Cream Powders

3,055. *I wish to manufacture ice-cream powders. Please supply me with as much information as possible—with formulæ, etc., both "hot" and "cold" mixes. I should like something with definite selling points*—i.e., *with advantages over present powders sold. I have read "Ice-cream", by Turnbow and Rafetto.* (Huddersfield.)

We suggest you consult the following books: *Handbook for Ice-cream Makers*, by L. J. Hynes; *Ice-cream Plant and Manufacture*, by R. G. Reid; and *Making of Ice-cream*, by L. R. M. Feltham, B.Sc.

A formula for hot-mix ice-cream powder is as follows:

Arrowroot	10 lb.
Powdered gelatine	1¼ ,,
Skim milk powder	3¾ ,,
Sugar (powder)	15 ,,

Add 6 oz. powder to quart of milk plus 6 to 8 oz. sugar. Heat the milk in a water-jacketed pan to about 90° C. Make the requisite quantity of powder into a thin cream with a little cold milk, and pour slowly into almost boiling bulk milk with vigorous agitation. Continue heating the whole in water-bath for another 10 to 25 minutes until it has finished thickening. Cool and freeze.

Of course, the colour and flavour added must depend on the quality of the materials used.

A formula for a cold process ice-cream powder was also given.

Heat and Vitamins in Canning

3,328. *As you are closely associated with modern methods of food production, etc., I should be obliged if you would be good enough to let me know—for office purposes and information only—the names of any official pamphlets which would indicate:*

(1) *The amount of heat used in the preparation of foodstuffs for canning, and*

(2) *What, if any, vitamins are lost or gained in the canning processes.*

Any further information on the general subject of food canning and public health would be welcome. (London.)

(1) This query cannot be replied to in the course of a letter. Foodstuffs are sterilised under widely different conditions according to their nature. A considerable amount of data is available in the publication we issue called *Food Industries Manual*, which is supplied free of cost to subscribers to our journal, FOOD MANUFACTURE.

(2) This matter is being epitomised in a publication which will appear early in the new year, and will give a complete study of the fate of vitamins during canning. This work has been done by the Campden Experimental Research Station, and the Rowett Institute, and will embody the very latest researches on the subject.

Iron in Water

3,316. *Could you suggest a method of testing water for iron contents, using a burette?* (Lancs.)

We suggest the following spot test for iron: aa′-Dipyridyl yields a pink colour with ferrous iron, and under specified conditions is suitable for its colorimetric determination. Iron in the ferric state does not give any colour. Although the reagent produces a blue tint with copper, this is barely perceptible even when the concentration of the copper is 1,000 times that of the iron needed to produce a just visible pink coloration. If other heavy metals, or zinc, are present it is necessary to use an excess of the reagent so that all the metals may be combined with the aa′-dipyridyl.

The following reagents are required:

A. 1 per cent. solution of aa′-dipyridyl to O.1N hydrochloric acid.

B. Freshly prepared 10 per cent. solution of sodium sulphite.

Approximately 5N hydrochloric acid.

Strong standard iron solution made by dissolving 0·4318 gram of ferric ammonium sulphate in a little water, adding 10 c.c. of concentrated hydrochloric acid and diluting to 1 litre.

A diluted standard iron solution A made by mixing 160 c.c. of the strong iron solution with 2 c.c. of 5 per cent. mercuric chloride solution and diluting to 1 litre with water. (This contains 80γ of Fe per c.c.).

The diluted iron solution B made by diluting 100 c.c. of standard iron solution A to 1 litre with water.

A series of permanent standards may be made in tubes of uniform bore, using 0·2 c.c. to 6 c.c. of standard iron solution B and 0·6 c.c. to 1 c.c. of standard iron solution A. To each is added 2 c.c. of the aa′-dipyridyl solution, 1 c.c. of sodium sulphite solution, 0·1 c.c. of 5N hydrochloric acid and then sufficient sodium sulphite solution to produce 10 c.c. After shaking, 2 drops of 5 per cent. mercuric chloride solution are added and the tubes sealed.

The liquid to be tested is treated in the same manner, and the colour produced compared with the standards. The test has been successfully applied to the determination of iron in biological material and, provided the reaction is within the limits *p*H 3·5 to *p*H 8·5, it is possible to apply a qualitative test directly without previous

destruction of the organic matter. The method is especially useful for the examination of natural waters. By omitting the treatment with sulphite, ferrous iron can be detected and determined to the exclusion of ferric iron.

Under the conditions described 0·2γ ($0·2 \times 10^{-6}$ grams) of iron gives an appreciable coloration.

Piping Jellies

3,261. *Some little time ago you had several articles in your journal on the special manufacture of piping jellies. You will doubtless have direct reference to these articles, and would you please be so kind as to intimate to us the volumes and the months of the journals in which these were published, as we shall then be able to more readily refer to same, as we have all the back numbers, but we have mislaid the index.* (Liverpool.)

In reply to your enquiry *re* the above, we refer you to the following articles and recipes published in FOOD MANUFACTURE:

May, 1931, page 130; February, 1932, page 45; June, 1931, page 176 (Enq. No. 267). Recipes: April, 1928, page 322; March, 1934, page 108; December, 1936, page 453.

Non-Setting Chocolate Mix

3,377. *We shall be very grateful to have some recipes for non-setting chocolate mix. Our purpose is to serve the chocolate with milk as a beverage.* (Beyrouth.)

Lecithin has been used in cocoa powder to increase the suspensibility of the particles in the beverage, but it must be remembered that lecithins are decomposed by alkalies with the liberation of choline and the production of amines. Lecithin, therefore, must not be used with alkalised cocoa powder, since it gives rise to an unexplained fishy odour.

It has been found that the use of quite a small quantity of lecithin will enable a considerable amount of cocoa-butter to be used to make a stable beverage without the separation of the fat at the surface.

Sherman-Bourquin Units

3,382. *How do the Sherman-Bourquin Units of Vitamins compare with the International System of Vitamin Classification?* (Manchester.)

The International unit of vitamin A is the potency of 0·6 gamma of beta carotene. (One gamma equals 0·001 milligram.) One Sherman unit approximates 1·4 International units. Thus the standard given in Sherman units may be changed to International units by multiplying by 1·4. This standard for vitamin A is that recommended by the Bureau of Home Economics in U.S.D.A. Cir. 296.

The International unit of vitamin B is defined as the antineuritic activity of a given amount of a standard concentrate made from rice polishings by a specific method. The International unit of vitamin B equals two Sherman-Chase units. Hence the above standard can be converted to International units by dividing it by two. There is no generally accepted standard for vitamin B, and this one is to be considered only very tentatively.

The International unit of vitamin C is the potency of 0·05 milligram of 1-cevi-taric acid. Approximately 15 International units of C are the equivalent of 1 Sherman unit. This standard for vitamin C is that recommended by the Bureau of Home Economics in U.S.A., Cir. 296.

Brick-built Brine Vats

3,403. *We would appreciate your advice in the following matter. Up to the present we have used oak tubs as brining vessels, but we are now reorganising our small factory and are anxious to know if a brick-built vat divided into three compartments and lined with cement (all corners rounded) and supplied with taps of large dimensions for drawing off would do as well.*

If you could let us know the action of strong brine on cement and meat, etc., also if it would be passed by the Health Inspector; if not, your suggestion of an alternative. (Wolverhampton.)

We are of the opinion that a brick-built vat lined with cement should be quite suitable for the brining of meat; in fact, it is very widely used in large meat factories, and more hygienic than wood. Provided that these vats are kept in a perfect state of cleanliness we do not anticipate any objections from the Health Inspector.

Care, of course, must be taken to repair any cracks that may appear, otherwise undesirable fermentations may ensue, but it is not difficult to keep these vats in perfect state of repair.

We recently saw an installation of brining vats made from stainless steel, and while the first cost may be rather high, their maintenance is nil, and there is no doubt about their extreme cleanliness and resistance to the action of brine and meat acids.

Sugar and Caramel

3,411. *Would you please tell me how to burn a sugar so as to obtain the highest tintorial effect; also something about the plant required?*

I understand that the production of caramel requires great skill; however, any information you could let me have would be greatly appreciated. (Australia.)

We rather think that you will find it waste of time to attempt to undertake the manufacture of this product, as it is one which calls for very great skill, and undoubtedly for previous experience. The difficulty, of course, is to regulate the process so that the product shall be of a standard uniform colour.

By far your best plan is to purchase the material from a reputable firm that operates on a large scale, and get a guarantee that their product will always be up to a certain standard of colour tint.

Alternatively you might put up the proposition to a chemical engineer who is familiar with this kind of work, and get him to give you a complete specification.

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TRADE MARKS

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

ASHERDALE. — 580,267. **Butter.** DENNY'S (BUTTER), LTD., Hibernia Chambers, London Bridge, London, S.E. 1. December 15.

CHOCPODGE.—581,097. **A food preparation containing oatmeal and chocolate.** CHARLES STANHOPE, 2, West Terrace, Eastbourne, Sussex. January 5.

LARK. — 581,343. **Margarine.** VERSCHURE'S CREAMERIES, LTD., 2, Water Street, Tudor Street, London, E.C. 4. (Associated.) January 5.

OLD SALT BRAND.—579,712. **Canned**

fish. PETTY, WOOD AND CO., LTD., 41 to 57, Southwark Bridge Road, London, S.E. 1. November 24.

PET.—579,042. **Condensed milk.** CON-

DENSED MILK COMPANY OF IRELAND (1928), LTD., Lansdowne, Limerick, Irish Free State. December 1.

RENICE.—581,228. **Confectionery and sweetmeats; and icing made of edible substances.** JOHN F. RENSHAW AND CO., LTD., Lock's Lane, Mitcham, Surrey. (Associated.) January 5.

ROUND ROBIN.—579,963. **Dried and tinned fruit.** FRANK OSTRANDER, 33, Eresby House, Rutland Gate, London, S.W. 7. November 24. (Associated.)

SALVO.—581,038. **Edible oils and edible fats.** LODERS AND NUCOLINE, LTD., 1, William Street, Tudor Street, London, E.C. 4. December 1.

SEA BREEZE.—574,385. **Canned salmon.** HENRY W. PEABODY AND CO., OF LONDON, LTD., 16, Eastcheap, London, E.C. 3. November 24. (By Consent.)

SEAGULL.—580,789. **Canned crab and canned pilchards.** GEORGE RICHARD COLE, trading as G. R. Cole and Co., 37, Mincing Lane, London, E.C. 3. December 29.

SPARKS. — 576,886. **Poultry for food.** EDWIN BARRETT, 27, Hockerill Street, Bishop's Stortford, Hertfordshire. December 8. (By Consent.)

SULIKANDE.—580,711. **Tea.** BROOKE, BOND AND COMPANY, LTD., Calcutta House, Goulston Street, Aldgate, London, E. 1. December 1.

SUN.—580,007. **Dates (for food).** ROBERT

VAUTRIN and MAURICE CROS, trading as Molinari and Vautrin, 84, Boulevard de la Corderie, Marseille, France. December 1.

Registration of this trade mark shall give no right to the exclusive use of the device of dates.

TRIMOLINE.—579,282. **Substances used as food or as ingredients in food.** RAFFINERIE TIRLEMONTOISE SOCIÉTÉ ANONYME, 1, rue Aindoren, Tirlemont, Belgium. December 1.

NEW COMPANIES

Jenkinson Cafés (Bolton), Limited. (333039.) Registered October 27, 1937. 15, Bradshawgate, Bolton. To carry on bus. as café, restaurant and hotel keepers, etc. Nom. Cap.: £500 in £1 shares. Dirs.: J. Jenkinson, 419, South Promenade, Blackpool; Mary L. Jenkinson, 419, South Promenade, Blackpool; J. S. Jenkinson, 67, Clifton Drive South, St. Annes-on-Sea.

Kays Kafes, Limited. (333269.) 3/11/37. To take over the bus. of a restaurant cd. on at 239, High Street, Walthamstow, E. 17., as "Freeman's Restaurant", and a similar business cd. on at 6, Malden Road, N.W. £500. Dirs.: K. Burton, 66, Wilbury Road, Hove (permt. mang. dir. and ch.); Miriam M. Burton, 66, Wilbury Road, Hove.

Keddie, Jones and Kesteven, Limited. (333040.) Registered October 27, 1937. To take over the bus. of tea, coffee and genl. produce brokers, etc., cd. on at 27, Mincing Lane, E.C., as "Jones and Kesteven". Nom. Cap.: £5,000 in £1 shares. Permt. joint mang. dirs.: F. Keddie, 40, Boileau Road, W. 5; J. Jones, 2, Grove Avenue, N. 10.

Kemp and Knox, Limited. (333125.) 29/10/37. Grocers, Italian warehousemen, etc. £300. Dirs.: F. Kemp, 2, Appian Place, Gateshead; Margaret Knox, Alnor, Station Road, Wallsend.

H. King and Son (Dulwich), Limited. (333198.) 1/11/37. 23, North Cross Road, East Dulwich, S.E. 22. Engrs., dairy and dairy farmers' utensil mnfrs., etc. £20,000. Dirs.: G. E. King, 142, Barry Road, S.E. 22 (permt. gov. dir.); Mrs. L. G. King, 142, Barry Road, S.E. 22; J. A. King, 47, Woodwarde Road, S.E. 22.

Stanley King, Limited. (333277.) 3/11/37. To take over the bus. of a butcher cd. on by S. King at Market Hall, Doncaster. £1,000. Permt. mang. dir.: S. King, Poplars Farm, Long Sandall, Doncaster.

Maple Products, Limited. (333043.) 27/10/37. Adelaide House, King William Street, E.C. 4. Dlrs. in and agents for canned goods, provisions, etc. £100. Permt. dir.: C. A. Harrison, 25, Westminster Mansions, Great Smith Street, S.W. 1.

M. S. Moore and Company, Limited. (333042.) Registered October 27, 1937. To take over the bus. of a mnfg. and wholesale and retail confectioner cd. on at 4, Church Walk, and elsewhere in Leamington Spa as "M. S. Moore". Nom. Cap.: £2,000 in £1 shares. Dirs.: M. S. Moore, Comber House, Leamington Spa; Mrs. E. L. Moore, Comber House, Leamington Spa; G. T. Gould, 1, Wood Street, Leamington Spa.

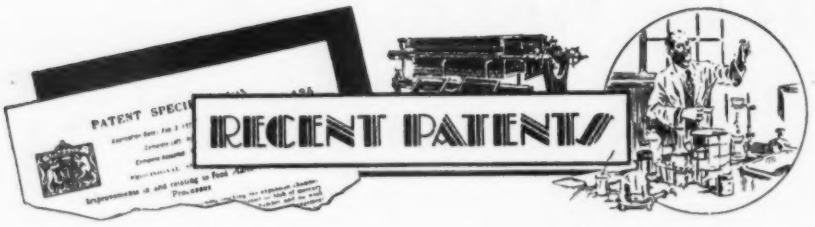
O.K. Milk Bars, Limited. (333093.) Registered October 28, 1937. To carry on the bus. of milk bar proprs., etc. Nom. Cap.: £100 in £1 shares. Permt. gov. dir.: J. L. Klackan, address not stated.

O.B.I.C., Limited. (333270.) 3/11/37. Mnfrs. of and dlrs. in ice-cream, etc. £100. Permt. dirs.: F. L. Annett, 16, The Highway, Sutton, Surrey; T. N. Atkinson, 32a, Earlsfield Road, S.W.18; J. L. Hackett, 279, Battersea Park Road, S.W. 7.

Parkers Bakeries, Limited. (3332935.) Registered October 25, 1937. To take over the bus. of bakers and confectioners, etc., cd. on at Bristol as "Parkers Bakeries". Nom. Cap.: £27,500 in £1 shares (17,500 redeemable pref. and 10,000 ord.). Dirs.: J. V. Parker, W. G. Weston, J. Calder and F. F. Parker, addresses not stated; R. W. Parker, Broadclyst, Ray Park Avenue, Maidenhead.

Pot Luck, Limited. (333135.) 29/10/37. Proprs. of cafés and restaurants, etc. £900. Permt. gov. dir. and ch.: K. Foss, 5, Hampstead Square, N.W. 3.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The "Official Journal of Patents" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications

27118. Oelwerke Akt.-Ges., W. R. N.: Preservation of whale flesh, etc. (Germany, September 4.)

25837. Paasch and Larsen, Petersen Aktieselskab: Cleaning of pasteurising apparatus. (Denmark, January 13.)

26005. Riess, C. A.: Production of durable potato pastes.

27488. Robinson, W. J.: Food products, etc.

27654. Rua, M.: Manufacture of milk products.

29053. Sale, A. W. W.: Devices for grading, etc., fruit.

27566. Sardik, Inc.: Apparatus for reducing the moisture content of fruit, etc., pulps. (United States, November 27, 1936.)

27596. Stevens, A. H. (Borden Co.): Dry milk products, etc.

28740. Svenska Aktiebolaget Gasaccumulator: Cooking, etc., apparatus. (Sweden, November 6, 1936.)

29407. Terry and Sons, Ltd., J.: Kettles for melting, etc., chocolate, etc.

28833. Theiner, L.: Grinding, etc., of chocolate, etc.

27852. Thompson and Norris Manufacturing Co., Ltd.: Boxes, etc.

27691. Untenecker, F.: Pastry cutters. (Hungary, October 15, 1936.)

28000. Volpertas, Z.: Reduction of vegetables containing starch to dry powder. October 14.

26101. Watts, A. E.: Stripping, etc., machines for sugar-beets, etc.

29318. Whitfield, C.: Apparatus for cooking eggs.

28473. Wolff and Co. Kommandit.-Ges.: Manufacture of artificial sausage skins, etc. October 19.

27616. Yacco Cos. Anon. Française: Apparatus for measuring the opacity of liquids. (Luxemburg, August 11, 1936.) (Cognate with 27615.)

27936. Green, R. M.: Absorbent material for ammonia in refrigeration.

27940, 28424. Endres, F.: Beet-harvesting processes. (Germany, October 19, 1936.)

27951, 27952. Poluzzi, R.: Apparatus for washing fruits, etc. (Italy, October 16, 1936.)

27994. Redler, A.: Treatment of cereals, etc.

Complete Specifications Accepted

473,506. Soc. d'Études et Applications Industrielles: Manufacture of concentrated sweetened milk products and substances derived therefrom. (September 21, 1936.) (Addition to 458,399.)

473,560. Wall's, Ltd., and Bayliss, J.: Safety valves for cooking vessels or digesters.

473,625. Continental Can Co., Inc.: Method of and apparatus for removing surplus coating from cans or like containers. (December 31, 1935.)

473,631. Haselbach, A.: Brewing of beer. (April 18, 1936.) (Addition to 453,082.)

473,764. Weyreuter, J.: Icing moulding and impressing table for applying colloidal and plastic substance to cakes and the like.

473,770. Industrial Patents Corporation: Method of and apparatus for treating liquid materials, particularly egg whites. (December 6, 1935.)

473,814. Allen, H. E., and McCaleb, A. G.: Celery salt. (January 24, 1936.)

473,833. Industrial Patents Corporation: Preparation of curd for the manufacture of pasteurised cheese, the preparation of pasteurised cheese and the curd, and pasteurised cheese resulting therefrom. (July 29, 1935.)

473,942. Kunzi, H.: Ice-cream freezers.

474,022. Plews, W. J.: Production of puffed cereals. (January 17, 1936.) (Divided out of 472,465.)

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

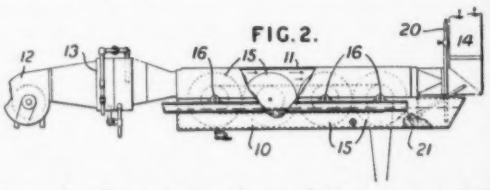
Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

469,011. Group VI. **Concentrated fruit and vegetable juice preparations.** Triggs, W. W. (Beau May Corporation).

A concentrated fruit or vegetable juice preparation is obtained by adding to the juice a soluble edible material—*e.g.*, partially inverted or other sugar—in such amount that the juice contains at least about 50 per cent. by weight of dissolved solids and then evaporating part of the water at a temperature below the boiling point of the solution at the prevailing pressure—*e.g.*, to bring the dissolved solid content to about 75 per cent. The partially inverted sugar may be added in the form of a syrup containing about 50 per cent. sucrose and the rest dextrose and lævulose. The temperature to which the juice is raised during concentration is kept below that at which the flavour deteriorates—*e.g.*, for juice of citrus fruit about 80° F., of grapes about 90° F., and of cherries about 120° F. In an example, the juice is supplied, admixed with sugar to form a syrup, through a pipe to a pan covered by an insulated hood through which air supplied by a blower through a heater is passed, escaping through a stack. Shafts carry each a series of discs, which are rotated with their lower portions immersed in the syrup, a film of which they carry up into the air stream. An agitator mixes the fresh juice with the heavier syrup in the pan. The syrup may be kept at below 90° F. while operating with air at 170° F., the pan being cooled by the surrounding air, and if necessary by a water jacket. The concentration of orange juice at 80° F. is described, a batch being started, using partially inverted sugar syrup as the added material, a new batch being started after the concentration, using part of the first concentrate as the added material. Continuing in this way the concentration of sugar is diminished in successive batches.

469,011. Group III. **Evaporators.** Triggs, W. W. (Beau May Process Corporation).



In apparatus for producing concentrated fruit or vegetable juice preparations the juice admixed with a soluble edible material—*e.g.*, with sugar to form a syrup—is supplied through a pipe 20 to a pan 10 covered by an insulated hood 11 through which air supplied by a blower 12 through a heater 13 is passed, escaping through a stack 14. Shafts 16 carry each a series of discs 15, which are rotated with their lower portions immersed in the syrup, a film of which they carry up into the air stream. An agitator 21 mixes the fresh juice with the heavier syrup in the pan. The syrup may be kept at below 90° F. while operating with air at 170° F., the pan 10 being cooled by the surrounding air, and if necessary by a water jacket.

470,573. **Stabilising oils and fats.** Du Pont de Nemours and Co., E. I.

Edible or other animal, fish, and vegetable oils and fats are stabilised—*e.g.*, against rancidity and discoloration—by dissolving or dispersing therein a sugar amine or a salt thereof. 0·001 to 2·0 per cent. of glucamine, methyl-glucamine, lauryl-glucamine, ethanol-glucamine, methyl-lauryl-glucamine, amyl-glucamine, butyl amine, or methyl-glucamine stearate is suitable. The sugar amine may be prepared by hydrogenating the product of interaction of a mono-, di-, or oligo-saccharide with ammonia or a primary or secondary amine as described in Specification 426,062.